

EXHIBIT A

EXHIBIT 118-19

Invalidity of U.S. Patent No. 12,015,118 over ATL 265066 Cell/Electrode in view of Japan Patent Application Publication No. JP 2013-211096 A (Ishigaki *et al.*)

As described in the following claim charts, Asserted Claims 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 15, 16, 17, 19, and 20 of U.S. Patent No. 12,015,118 (“the ’118 patent”) are invalid because they are obvious under 35 U.S.C. § 103 over prior-art ATL battery cells having cathode materials that are represented by the ATL 265066 cell (“ATL 265066 Cell/Electrode”) in view of Japan Patent Application No. JP 2013-21106 A to Ishigaki *et al.* (“Ishigaki”).

The ATL 265066 Cell/Electrode was on-sale at least as early as January 2017.¹ COSMXATLTX-00048243-00048271. Ishigaki was filed at least as early as March 28, 2012, and it published on October 10, 2013. The ATL 265066 Cell/Electrode and Ishigaki are prior art to the ’118 patent under at least 35 U.S.C. § 102(a). Neither the ATL 265066 Cell/Electrode nor Ishigaki were examined by the Patent Office during the prosecution of the ’118 patent.

A person of ordinary skill in the art (“POSA”) would have been motivated to combine, with a reasonable expectation of success, the ATL 265066 Cell/Electrode with the disclosures and teachings of Ishigaki, as discussed in the chart below.

A POSA would have been motivated to combine the ATL 265066 Cell/Electrode with the disclosures and teachings of Ishigaki. For example, the ATL 265066 Cell/Electrode and Ishigaki are analogous to each other as each is related to electrode active material layer(s) and their structures and compositions in lithium-ion batteries. The ATL 265066 Cell/Electrode and Ishigaki provide overlapping disclosures of the electrode active material layer(s), including their compositions and manufacturing processes. The ATL 265066 Cell/Electrode and Ishigaki disclose most, if not all, of the elements of the Asserted Claims, including electrode active material layers for use in lithium-ion batteries that are pressed to advantageous compaction densities. *See, e.g.*, Ishigaki, ¶ [0024].

A POSA would have been motivated to apply Ishigaki’s teachings, including Ishigaki’s “primer” layer and specific compaction densities, to the ATL 265066 Cell/Electrode. For example, Ishigaki teaches that electrode active material layers placed directly onto a current collector surface can detach, leading to concerns about internal short circuits. *See, e.g.*, Ishigaki, ¶ [0013]. To address this, Ishigaki introduces an intervening “primer” layer on the current collector surface beneath the active material layer. This

¹ As detailed in COSMXATLTX-00048243-00048271, the exemplary ATL 265066 Cell/Electrode in the chart below was removed from a 6th-generation Apple iPod touch (or iPod touch 6). Apple released the iPod touch 6 on July 15, 2015, and officially discontinued it on May 28, 2019. The exemplary ATL 265066 Cell/Electrode in the chart below was stamped with a manufacturing date of “01/2017,” *i.e.*, January 2017. COSMXATLTX-00048249.

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“primer” layer increases adhesion to the current collector, guards against internal short circuits, and reduces costs, making it an attractive solution for improving the safety and performance of the ATL 265066 Cell/Electrode. Ishigaki further emphasizes the benefits of the “primer” layer by highlighting its role in enhancing safety against internal short circuits and improving battery characteristics such as high output and high capacity. Ishigaki’s disclosure includes detailed descriptions of short circuit tests involving nail insertion, where the “primer” layer demonstrated superior performance. *See, e.g.*, Ishigaki, ¶¶ [0374]-[0382]. For instance, the temperature rise rate in the example with the “primer” layer was slower than in comparative examples, indicating improved safety. The short circuit current was also suppressed, reducing heat generation around the short circuit point. *See, e.g.*, Ishigaki, ¶¶ [0013], [0383]. These results show that the “primer” layer significantly enhances the safety and performance of lithium rechargeable batteries, providing a strong motivation for a POSA to incorporate it into the ATL 265066 Cell/Electrode. Ishigaki teaches the same benefits are achieved with compaction densities greater than greater than 3.2 g/cm³ “achieves high safety.” *See, e.g.*, Ishigaki, ¶ [0152].

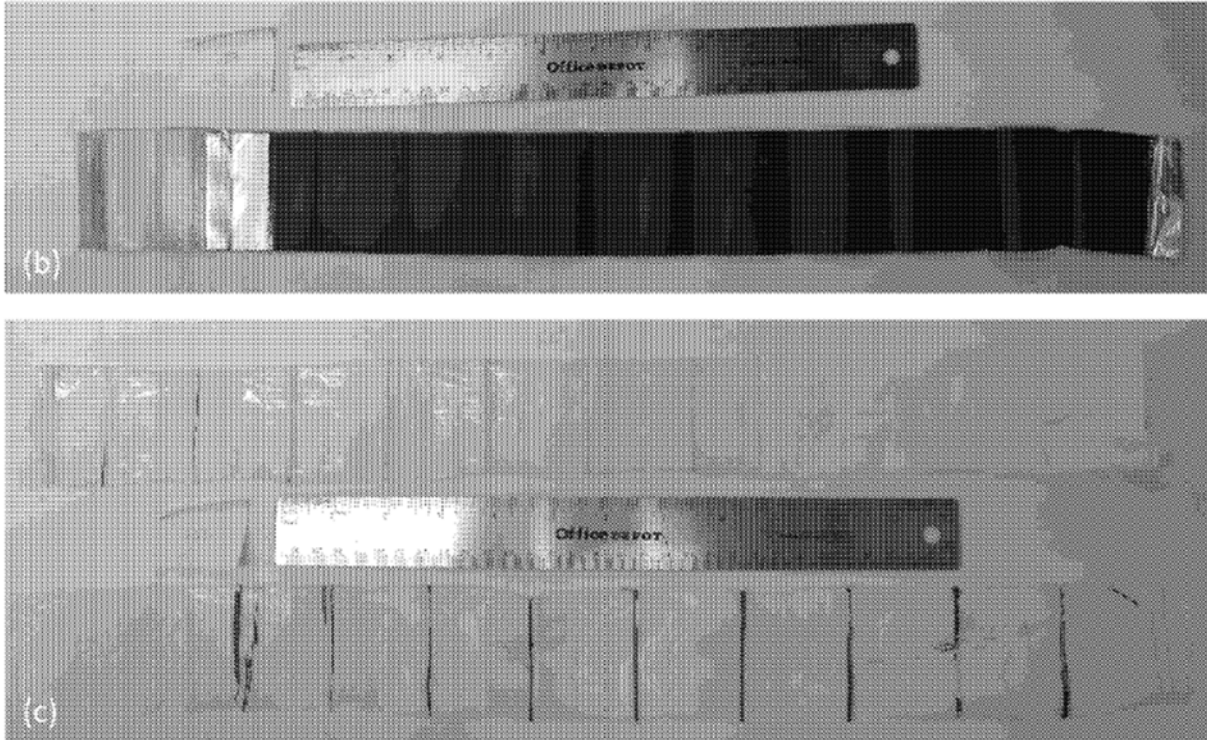
A POSA would have had a reasonable expectation of success in applying Ishigaki’s teachings to the ATL 265066 Cell/Electrode. For example, ~~upon information and belief~~, the cathode active material layer in the ATL 265066 Cell/Electrode comprises lithium cobalt, which Ishigaki also identifies as a preferred cathode active material. *See, e.g.*, Ishigaki, ¶¶ [0156]-[0157]. Given the common materials and methods used in both the ATL 265066 Cell/Electrode and Ishigaki’s electrodes, a POSA would have anticipated predictable results from implementing Ishigaki’s teachings, including Ishigaki’s “primer” layer and specific compaction densities, in the ATL 265066 Cell/Electrode. The exercise of ordinary skill would have sufficed to achieve the desired outcomes, as the processes and materials involved were well understood and widely used in the field.

Moreover, a POSA would have expected success in combining the ATL 265066 Cell/Electrode with Ishigaki’s teachings due to the compatibility of their compaction densities and manufacturing processes. For example, in addition to the common materials and methods used in both the ATL 265066 Cell/Electrode and Ishigaki’s electrodes, ~~on information and belief~~, the ATL 265066 Cell/Electrode already achieved a compaction density of more than 3.2 g/cm³, which falls within Ishigaki’s range. This density allows for increased packing density of particles in the cathode active material layer, leading to high energy density and increased battery capacity. Both the ATL 265066 Cell/Electrode and Ishigaki’s electrodes utilize well-known calendering processes, such as roll pressing, to achieve specific compaction density targets. *See, e.g.*, Ishigaki, ¶ [0366]. These predictable and established methods would have given a POSA confidence in successfully integrating Ishigaki’s teachings into the ATL 265066 Cell/Electrode, resulting in improved safety and performance.

Claim	Corresponding Prior Art Disclosures
1[pre]: An electrode, comprising:	The ATL 265066 Cell/Electrode and Ishigaki disclose “[a]n electrode, comprising:” For example, the ATL 265066 Cell/Electrode comprises a cathode: Figure 4 consists of three black and white photographs. (a) shows a small, rolled-up 'jelly roll' next to a battery pouch. (b) shows the 'jelly roll' fully unfolded, revealing a long, dark strip (cathode) with a lighter strip (aluminum current collector) visible at the edges. (c) shows two strips of separators separated from the electrodes, with the cathode and anode visible on the left and right sides respectively. Figure 4. (a) 'jelly roll' removed from and placed next to the battery pouch, (b) fully unfolded 'jelly roll.' The black strip is the cathode with the aluminum current collector visible at short edges. The anode and the separators are below the cathode strip, not visible in this photo, but the copper anode current collector is visible on the lefthand side, (c) Two strips of separators were separated from the electrodes (cathode and anode) COSMXATLTX-00048250-00048251.

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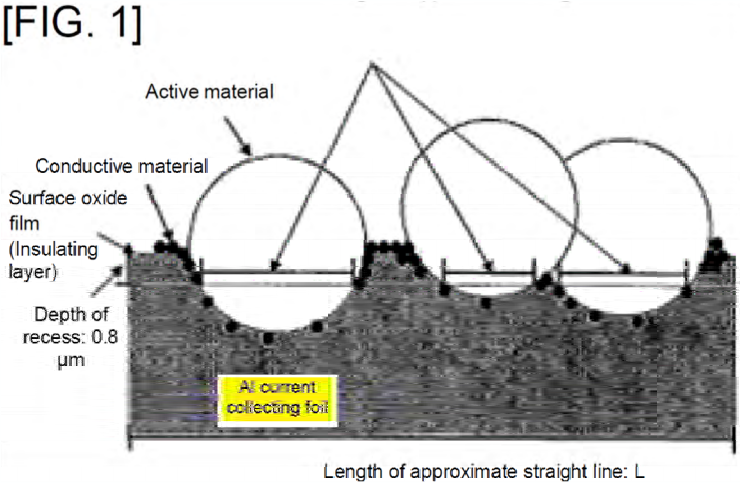
Claim	Corresponding Prior Art Disclosures
	Ishigaki also discloses “[a]n electrode, comprising:” For example, Ishigaki discloses an electrode, such as a positive electrode or cathode. <i>See, e.g.,</i>: Ishigaki, [Title of Invention] (“POSITIVE ELECTRODE FOR LITHIUM RECHARGEABLE BATTERY AND LITHIUM RECHARGEABLE BATTERY USING SUCH.”). Ishigaki, [Abstract] (“[Problem] To provide a positive electrode for lithium rechargeable batteries that ensures a high level of safety against internal short circuits in the battery and has excellent battery characteristics such as high output and high capacity, and a lithium rechargeable battery that uses the positive electrode for lithium rechargeable batteries.”). Ishigaki, [Claim 1] (“A positive electrode for lithium rechargeable batteries comprising: on a current collecting foil, a mixture of an electrode made by including a positive electrode active material of a compound capable of absorbing and releasing lithium, a conductive material, and a binder, wherein: a mixture density of an electrode is 2.0 g/cm³ or more; the current collecting foil has recessed portions; and a line segment connecting portions on the collector foil surface to which the mixture adheres and which do not form the recessed portions is approximated to a straight line, a length of the obtained approximate straight line is L, a parallel line having a depth of 0.8 μm is taken from the approximate straight line, a total length of the recessed portions of the parallel line is ΔL, and a ratio of the recessed portions per unit length is ΔL/L, where ΔL/L is 5% or less.”). Ishigaki, ¶ [0001] (“The present invention relates to a positive electrode for lithium rechargeable batteries used in lithium rechargeable batteries and the like, and to a lithium rechargeable battery using the positive electrode for lithium rechargeable batteries.”). Ishigaki, ¶ [0014] (“That is, the present invention has the following as the main points. (1) A positive electrode for lithium rechargeable batteries on a current collecting foil, a mixture of an electrode made by including a positive electrode active material of a compound capable of absorbing and releasing lithium, a conductive material, and a binder ...”).
1[a]: a current	The ATL 265066 Cell/Electrode comprises “a current collector;”

Claim	Corresponding Prior Art Disclosures
collector;	For example, the ATL 265066 Cell/Electrode comprises an “aluminum current collector visible at short edges”:  Figure 4. (a) 'jelly roll' removed from and placed next to the battery pouch, (b) fully unfolded 'jelly roll.' The black strip is the cathode with the aluminum current collector visible at short edges. The anode and the separators are below the cathode strip, not visible in this photo, but the copper anode current collector is visible on the lefthand side, (c) Two strips of separators were separated from the electrodes (cathode and anode) COSMXATLTX-00048250-00048251.

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Claim	Corresponding Prior Art Disclosures
	Ishigaki also discloses “a current collector;” For example, Ishigaki discloses a current collector, such as a current collector foil. <i>See, e.g.,</i>: Ishigaki, [Abstract] (“[Resolution Means] A positive electrode is used having a mixture density of 2.0 g/cm³ or more of an electrode, wherein the collector foil has recessed portions, a line segment connecting portions on the collector foil surface to which the mixture adheres and which do not form the recessed portions is approximated to a straight line, a length of the obtained approximate straight line is L, a parallel line having a depth of 0.8 μm is taken from the approximate straight line, a total length of the recessed portions of the parallel line is ΔL, and a ratio of the recessed portions per unit length is ΔL/L, where ΔL/L is 5% or less.”). Ishigaki, [Claim 1] (“A positive electrode for lithium rechargeable batteries comprising: on a current collecting foil, a mixture of an electrode made by including a positive electrode active material of a compound capable of absorbing and releasing lithium, a conductive material, and a binder, wherein: a mixture density of an electrode is 2.0 g/cm³ or more; the current collecting foil has recessed portions; and a line segment connecting portions on the collector foil surface to which the mixture adheres and which do not form the recessed portions is approximated to a straight line, a length of the obtained approximate straight line is L, a parallel line having a depth of 0.8 μm is taken from the approximate straight line, a total length of the recessed portions of the parallel line is ΔL, and a ratio of the recessed portions per unit length is ΔL/L, where ΔL/L is 5% or less.”). Ishigaki, ¶ [0014] (“(1) A positive electrode for lithium rechargeable batteries on a current collecting foil, a mixture of an electrode made by including a positive electrode active material of a compound capable of absorbing and releasing lithium, a conductive material, and a binder, wherein a mixture density of an electrode is 2.0 g/cm³ or more, the current collecting foil has recessed portions, a line segment connecting portions on the collector foil surface to which the mixture adheres and which do not form the recessed portions is approximated to a straight line, a length of the obtained approximate straight line is L, a parallel line having a depth of 0.8 μm is taken from the approximate straight line, a total length of the recessed portions of the parallel line is ΔL, and a ratio of the recessed portions per unit length is ΔL/L, where ΔL/L is 5% or less.”).

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Claim	Corresponding Prior Art Disclosures
	Ishigaki, ¶ [0020] (“<Surface Portions and Recessed Portions of Current Collecting Foil> In the present specification, the surface of the current collecting foil refers to an interface between the electrode mixture and the current collector, which is a surface of the current collector that does not have any recessed portions due to scratches or the like. Note that when the current collector has an exposed portion that does not support the mixture, this is not included in the length L of the approximation curve of the surface of the current collecting foil.”). Ishigaki, FIG. 1: [FIG. 1] 
1[b]: a first layer comprising a first material, and	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “a first layer comprising a first material, and” The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f], to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures.

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Claim	Corresponding Prior Art Disclosures
	Ishigaki teaches and discloses a “first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. For example, Ishigaki discloses a first layer comprising a first material. <i>See, e.g.,</i>: Ishigaki, [Claim 7] (“The positive electrode for lithium rechargeable batteries according to any one of claims 1 through 6, wherein “a first positive electrode mixture layer comprising a first positive electrode active material and a second positive electrode mixture layer comprising a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector.”). Ishigaki, ¶ [0014] (“(7) The positive electrode for lithium rechargeable batteries according to any one of (1) through (6), characterized in that a first positive electrode mixture layer containing a first positive electrode active material and a second positive electrode mixture layer containing a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector.”). Ishigaki, ¶ [0024] (“The positive electrode active material layer is usually produced by dry-mixing a conductive material, a positive electrode active material, a binder, and further, a thickener or the like as necessary into a sheet form, which is then pressed onto the positive electrode current collecting foil, or these materials are usually dissolved or dispersed in a liquid medium such as an organic solvent to form a slurry, which is then coated on the positive electrode current collecting foil and dried.”). Ishigaki, ¶¶ [0037]-[0038] (“<Median Diameter and 90% Cumulative Diameter (D90)> The median diameter at the positive electrode preparation stage of the lithium transition metal compound powder of the present invention is normally 0.1 μm or more, preferably 0.3 μm or more, more preferably 0.6 μm or more, even more preferably 0.8 μm or more, and most preferably 1.2 μm or more; and normally 5 μm or less, preferably 4 μm or less, more preferably 3 μm or less, even more preferably 2.8 μm or less, and most preferably 2.5 μm or less. So long as the median diameter is within this range, the coating property during the formation of the positive electrode active material layer is favorable, and the ratio of recessed portions per unit area of the current collecting foil is low, so that safety against internal short circuits is high. ... In addition, a 90% cumulative diameter (D90) of the secondary particles of the lithium transition metal

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	compound powder of the present invention is normally 10 μm or less, preferably 8 μm or less, more preferably 6 μm or less, and most preferably 5 μm or less; and normally 0.5 μm or more, preferably 0.8 μm or more, more preferably 1 μm or more, and most preferably 1.5 μm or more. If the 90% cumulative diameter (D90) exceeds the upper limit, a reduction in battery performance may be brought about, whereas if the lower limit is exceeded, an issue may arise in the coating properties when forming the positive electrode active material layer.”). Ishigaki, ¶¶ [0061]-[0062] (“<Composition> In addition, the lithium transition metal compound powder of the present invention is preferably a lithium transition metal system complex oxide powder represented by the following composition formula (I). $\text{LiMO}_2 \dots$ (I) However, M is an element constituted from Li, Ni, and Mn, or from Li, Ni, Mn, and Co, and the molar ratio of Mn/Ni is normally 0.3 or more, preferably 0.5 or more, more preferably 0.6 or more, even more preferably 0.7 or more, even further preferably 0.8 or more, and most preferably 0.9 or more; and normally 5 or less, preferably 4 or less, more preferably 3 or less, even more preferably 2.5 or less, and most preferably 1.5 or less. The molar ratio of Co/(Mn + Ni + Co) is normally 0 or more, preferably 0.01 or more, more preferably 0.02 or more, even more preferably 0.03 or more, and most preferably 0.05 or more; and normally 0.30 or less, preferably 0.20 or less, more preferably 0.15 or less, even more preferably 0.10 or less, and most preferably 0.099 or less. The molar ratio of Li in M is 0.001 or more, preferably 0.01 or more, more preferably 0.02 or more, even more preferably 0.03 or more, and most preferably 0.05 or more; and normally 0.2 or less, preferably 0.19 or less, more preferably 0.18 or less, even more preferably 0.17 or less, and most preferably 0.15 or less.”). Ishigaki, ¶ [0066] (“<Preferred Composition> It is particularly preferable that the lithium transition metal compound powder for a lithium rechargeable battery positive electrode material of the present invention have an atomic structure at the M site in the composition formula (I) that is represented by formula (II). $\text{M} = \text{Li}_z/(2+z)\{(\text{Ni}(1+y)/2\text{Mn}(1-y)/2)1-x\text{Co}_x\}2/(2+z) \dots \text{(II)}$ (However, in the above formula (II), $0 \leq x \leq 0.1$, $-0.1 \leq y \leq 0.1$, “$(1-x)(0.05-0.98y) \leq z \leq (1-x)(0.20-0.88y)$”). Ishigaki, ¶ [0138] (“[Method of Making Positive Electrode] The positive electrode active material layer is usually made by dry-mixing a positive electrode material used in the present invention, a conductive

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	material used in the present invention, a binder, a thickener, and the like into a sheet form, which is then pressed onto the positive electrode current collecting foil, or these materials are dissolved or dispersed in a liquid medium to form a slurry, which is then coated on the positive electrode current collecting foil and dried.”). Ishigaki, ¶¶ [0141]-[0142] (“<Binder> In the present invention, the binder used in the production of the positive electrode active material layer is not particularly limited as long as it is commonly used, examples including resin polymers such as polyethylene, polypropylene, polyethylene terephthalate, polymethyl methacrylate, aromatic polyamide, cellulose, and nitrocellulose, rubber polymers such as SBR (styrene-butadiene rubber), NBR (acrylonitrile-butadiene rubber), fluororubber, isoprene rubber, butadiene rubber, and ethylene-propylene rubber, styrene-butadiene-styrene block copolymers and hydrogenated products thereof, thermoplastic elastomer polymers such as EPDM (ethylene-propylene-diene ternary copolymer), styrene-ethylene-butadiene-ethylene copolymers, styrene-isoprene styrene block copolymer, and hydrogenated products thereof, soft resinous polymers such as syndiotactic-1,2-polybutadiene, polyvinyl acetate, ethylene-vinyl acetate copolymers, and propylene-α-olefin copolymers, fluorine-based polymers such as polyvinylidene fluoride (PVdF), polytetrafluoroethylene, fluorinated polyvinylidene fluoride, and polytetrafluoroethylene-ethylene copolymers, polyacrylonitrile, and polymer compositions having ionic conductivity for alkali metal ions (particularly lithium ions). Among these, from the viewpoint of oxidation resistance, fluorine-based polymers such as polypropylene, SBR (styrene-butadiene rubber), polyacrylonitrile, polyvinylidene fluoride (PVdF), polytetrafluoroethylene, fluorinated polyvinylidene fluoride, and polytetrafluoroethylene-ethylene copolymers are preferred, with polyacrylonitrile, polyvinylidene fluoride (PVdF), and SBR (styrene-butadiene rubber) being particularly preferred. Furthermore, from the viewpoint of adhesion to the current collecting foil, it is preferable that these polymers have functional groups that have affinity with the surface of the current collecting foil.”). Ishigaki, ¶ [0153] (“<Electrode Plate Laminate> Likewise, with a positive electrode for lithium rechargeable batteries—which is characterized by having laminated: a first positive electrode mixture layer containing a first positive electrode active material possessing the current collecting foil surface structure described above, and a second positive electrode mixture layer containing a second positive electrode active material whose particle diameter is larger than that of the first positive electrode active material—suitable performance can be obtained while safety is maintained, and is therefore preferable. Moreover, the positive electrode active material stated above may be used here for the first positive electrode mixture layer. Furthermore, the

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	following lithium transition metal compound is preferable for the second positive electrode active material.”). Ishigaki, ¶¶ [0347]-[0348] “(Preparation of positive electrode 1) As the positive electrode active material, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 50% by mass, and a uniform slurry was prepared using a planetary centrifugal mixer. Next, the slurry was applied onto both sides of aluminum foil (thickness 15 μm) serving as a current collecting foil using a roll coater, and then dried. The weight was 34.79 mg/cm². This coating film was pressed to 2.55 g/cm³ mixture density using a roll press. The pressed coating film was slit into a size of 54 mm x 615 mm to form a positive electrode. A portion of the prepared positive electrode was used to perform an interface evaluation (measurement of the ratio and average depth of the recesses of the current collecting foil).”). Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the

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	substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press. The first layer was 35 μm thick and the second layer was 34 μm thick. The total weight of the mixture was 17 mg/cm^2, and the mixture density was 2.4 g/cm^3. A portion of the prepared positive electrode was used to perform an interface evaluation (measurement of the ratio and average depth of the recesses of the current collecting foil).”). It would have been obvious to combine the ATL 265066 Cell/Electrode with Ishigaki. Ishigaki and the ATL 265066 Cell/Electrode are analogous art. Both relate to lithium-ion battery electrode structures and compositions, and share common features such as electrode active material layers, current collectors, and the like. Ishigaki and the ATL 265066 Cell/Electrode also share similar cathode active layer materials. <i>See, e.g.</i>, Ishigaki, ¶¶ [0156]-[0157] (“<Lithium Transition Metal Compound> The second positive electrode active material (lithium transition metal compound) of the present invention is a compound having a structure capable of removing and inserting a Li ion, and examples thereof include sulfides, phosphate compounds, lithium transition metal 30 complex oxides, and the like. Examples of sulfides include compounds with two-dimensional layered structures such as TiS_2 and MoS_2, and Chevrel compounds with strong three-dimensional framework structures expressed by the general formula $\text{Me}_x\text{Mo}_6\text{S}_8$ (Me is any transition metal including Pb, Ag, and Cu). Examples of phosphate compounds include those that belong to an olivine structure, which are generally expressed as LiMePO_4 (Me being at least one transition metal), and specific examples include LiFePO_4, LiCoPO_4, LiNiPO_4, LiMnPO_4 and the like. Examples of lithium transition metal complex oxides include those having a spinel structure that allows for three-dimensional diffusion, and those having a layered structure that allows for two-dimensional diffusion of lithium ions. Those having a spinel structure are generally expressed as LiMe_2O_4 (Me is at least one transition metal), 40 and specific examples include LiMn_2O_4, LiCoMnO_4, $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$, CoLiVO_4, and the like. Those that have a layered structure are generally expressed as LiMeO_2 (Me is at least one transition metal), and the following may be given as specific examples: LiCoO_2, LiNiO_2, $\text{LiNi}_{1-x}\text{Co}_x\text{O}_2$, $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$, $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Mn}_{0.4}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Ti}_{0.4}\text{O}_2$, LiMnO_2, and the like. The second positive electrode active material (lithium transition metal compound powder) of the present invention is preferably constituted by the inclusion of a crystal structure attributable to a layer structure. Among these, compounds containing a crystal structure attributable to a layered structure are particularly preferred....”). ~~Upon information and belief~~, Ishigaki and the ATL 265066 Cell/Electrode likewise involve the same kinds of manufacturing processes, such as roll-pressing or calendering electrode active material layers to increase

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	their density and improve battery capacity. <i>See, e.g.</i>, Ishigaki, ¶¶ [0024]-[0025] (“The positive electrode active material layer is usually produced by dry-mixing a conductive material, a positive electrode active material, a binder, and further, a thickener or the like as necessary into a sheet form, which is then pressed onto the positive electrode current collecting foil, or these materials are usually dissolved or dispersed in a liquid medium such as an organic solvent to form a slurry, which is then coated on the positive electrode current collecting foil and dried. Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a hand press, a roller press, or the like in order to increase the packing density of the positive electrode active material. The mixture density of the electrode of the present invention is characterized as 2.0 g/cm³ or more, and from the viewpoint of increasing capacitance density, it is preferably 2.0 g/cm³ or more, and particularly preferably 2.5 g/cm³ or more. The upper limit is not particularly limited, but since space is required in the positive electrode plate to hold the electrolyte in the electrode plate and to supply lithium ions, the upper limit is preferably 3.6 g/cm³ or less, more preferably 3.5 g/cm³ or less, and particularly preferably 3.4 g/cm³ or less. The thickness of the positive electrode active material layer is usually about 10 to 200 μm.”). A POSA would have been motivated to apply Ishigaki’s first layer in the ATL 265066 Cell/Electrode. For example, a POSA would have understood from Ishigaki that electrode active material layers placed directly onto a current collector surface can detach from the current collector which creates concerns about internal short circuits. Ishigaki addresses this problem by applying an intervening “primer” layer on the surface of the current collector and beneath the active material layer—exactly the “first layer” recited in claim 1[b], 1[d], 1[e], and 1[f]. Ishigaki specifically teaches that this “primer” layer helps to increase adhesion to the current collector, to guard against internal short circuits, and to reduce costs. <i>See, e.g.</i>, Ishigaki, ¶ [0013] (“An attempt to actively bring the active material into close contact with the current collector and inhibit detachment of the active material in the event of an abnormality, as in Patent Document 4, is insufficient in terms of safety against internal short circuits. In electrodes in which different active materials are simply stacked, as in Patent Documents 5, 6, and 7, even when the battery performance is improved, no effort is made to reduce the recessed portions of the electrode plate, and safety against rapid localized heat generation is insufficient. In contrast, by reducing the particle diameter of the active material compared to a positive electrode active material such as in Patent Document 1 and controlling the degree of 10 adhesion to the current collector, a high-output active material layer and a high-resistance interface on the surface of the current collecting foil

Claim	Corresponding Prior Art Disclosures
	can be obtained at low cost. Furthermore, by laminating a positive electrode active material layer having other excellent battery characteristics on the active material layer, a high level of safety against internal short circuits can be imparted to the conventional battery characteristics. Furthermore, in order to overcome the above problems, the present invention has an object to provide a positive electrode for lithium rechargeable batteries that ensures a high level of safety against internal short circuits in the battery and has excellent battery characteristics such as high output and high capacity, and a lithium rechargeable battery that uses the positive electrode for lithium rechargeable batteries.”). A POSA would have also been motivated by Ishigaki’s disclosure of improved performance in short circuit tests using nail insertion. Ishigaki, ¶¶ [0374]-[0382] (describing short circuit testing involving nail insertion and superior performance in short circuit test results for Example 2, which had a two-layer electrode active material layer). For example, Ishigaki concludes: Concerning safety against internal short circuits, it is apparent from Table 5 that the temperature rise rate of the example is slower than that of the comparative examples, and therefore safety against internal short circuits is improved. From the short circuit test results of the electrode plate laminate in Table 6, in examples 1 and 2, the short circuit current was suppressed, and thus the temperature rise due to heat generation around the short circuit point was suppressed to below the shutdown temperature of the separator. It can be seen that example 2 has a current collector surface structure similar to that of example 1, and thus has a high level of safety against internal short circuits, even though a positive electrode active material different from that of example 1 is laminated therein. That is, it is understood that the positive electrode for lithium rechargeable batteries according to the present invention has a higher output than conventional positive electrodes, and simultaneously, the safety against internal short circuits is improved. Ishigaki, ¶ [0383]. A POSA would have had a reasonable expectation of success in applying Ishigaki’s first layer in the ATL 265066 Cell/Electrode. For example, the cathode active material layer in the ATL 265066 Cell/Electrode comprises lithium cobalt. Ishigaki likewise discloses lithium cobalt as a preferred cathode active material in the layer positioned above Ishigaki’s first layer. <i>See, e.g.</i>, Ishigaki, ¶¶ [0156]-[0157]. A POSA would have appreciated that implementing Ishigaki’s first layer in the ATL 265066 Cell/Electrode would have involved

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	the exercise of ordinary skill, with predictable results, given the common materials and methods used to make the ATL 265066 Cell/Electrode and Ishigaki's electrodes.
1[c]: a second layer comprising a second material;	The ATL 265066 Cell/Electrode comprises “a second layer comprising a second material;” For example, the ATL 265066 Cell/Electrode comprises a cathode active material layer that, ~~upon information and belief,~~ comprises lithium cobalt. The figure consists of a scanning electron micrograph (SEM) and three energy-dispersive X-ray (EDS) spectra. The SEM image shows a cross-section of the electrode with a scale bar of 25 μm. Three regions are highlighted: Area 1 (cobalt oxide active material), Area 2 (aluminum current collector), and Area 3 (cobalt oxide active material). The EDS spectra show peaks for Co, O, Al, and C. The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f], beneath the cathode active material layers in the ATL 265066 Cell/Electrode, <i>i.e.</i>, the claimed second layer, to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki's teachings and disclosures, for the reasons discussed above for claim 1[b]. Ishigaki also discloses “a second layer comprising a second material;”

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	For example, Ishigaki discloses a second layer comprising a second material. <i>See, e.g.,</i>: Ishigaki, [Claims 7 and 8] (“[Claim 7] The positive electrode for lithium rechargeable batteries according to any one of claims 1 through 6, wherein a first positive electrode mixture layer comprising a first positive electrode active material and a second positive electrode mixture layer comprising a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector. [Claim 8] The positive electrode for lithium rechargeable batteries according to any one of claims 1 through 7, wherein a median diameter of the second positive electrode active material (lithium transition metal compound powder) is 6 μm or more and 20 μm or less.”). Ishigaki, ¶ [0014] (“(7) The positive electrode for lithium rechargeable batteries according to any one of (1) through (6), characterized in that a first positive electrode mixture layer containing a first positive electrode active material and a second positive electrode mixture layer containing a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector. (8) The positive electrode for lithium rechargeable batteries according to any one of (1) through (7), characterized in that a median diameter of the second positive electrode active material (lithium transition metal compound powder) is 6 μm or more and 20 μm or less.”). Ishigaki, ¶ [0153] (“<Electrode Plate Laminate> Likewise, with a positive electrode for lithium rechargeable batteries—which is characterized by having laminated: a first positive electrode mixture layer containing a first positive electrode active material possessing the current collecting foil surface structure described above, and a second positive electrode mixture layer containing a second positive electrode active material whose particle diameter is larger than that of the first positive electrode active material—suitable performance can be obtained while safety is maintained, and is therefore preferable. Moreover, the positive electrode active material stated above may be used here for the first positive electrode mixture layer. Furthermore, the following lithium transition metal compound is preferable for the second positive electrode active material.”). Ishigaki, ¶¶ [0154]-[0164] (“[Lithium Transition Metal Compound Powder (Second Positive Electrode Active Material)] The second positive electrode active material of the present invention has a lithium

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	transition metal compound having a lithium ion insertion/removal capability as a primary component, and for the primary component source, a compound (referred to as 'additive 1' below) containing at least one type of element selected from B and Bi (referred to as 'additive element 1' below), and a compound (referred to as 'additive 2' below) containing at least one type of element selected from Mo, W, Nb, Ta, and Re (referred to as 'additive element 2' below) are, as one type each or more thereof, added in combination, after which a fired powder is formed, and on a mercury intrusion curve via mercury intrusion porosimetry on the powder, a mercury intrusion amount during an elevated pressure from 3.86 kPa to 413 MPa is preferably less than 0.4 cm³/g. Alternatively, a lithium transition metal compound having a lithium ion insertion/removal capability is used as a primary component, and for the primary component source, a compound (referred to as 'additive 1' below) containing at least one type of element selected from B and Bi (referred to as 'additive element 1' below), and a compound (referred to as 'additive 2' below) containing at least one type of element selected from Mo, W, Nb, Ta, and Re (referred to as 'additive element 2' below) are, as one type each or more thereof, added in combination, after which a fired powder is formed, and on a pore distribution curve via mercury intrusion porosimetry on the powder possesses a main peak whose peak top is present at a pore radius of 1,600 nm or more and 4,000 nm or less, and a subpeak whose peak top is present at a pore radius of 80 nm or more and less than 1,600 nm. <Lithium Transition Metal Compound> The second positive electrode active material (lithium transition metal compound) of the present invention is a compound having a structure capable of removing and inserting a Li ion, and examples thereof include sulfides, phosphate compounds, lithium transition metal complex oxides, and the like. Examples of sulfides include compounds with two-dimensional layered structures such as TiS₂ and MoS₂, and Chevrel compounds with strong three-dimensional framework structures expressed by the general formula Me_xMo₆S₈ (Me is any transition metal including Pb, Ag, and Cu). Examples of phosphate compounds include those that belong to an olivine structure, which are generally expressed as LiMePO₄ (Me being at least one transition metal), and specific examples include LiFePO₄, LiCoPO₄, LiNiPO₄, LiMnPO₄ and the like. Examples of lithium transition metal complex oxides include those having a spinel structure that allows for three-dimensional diffusion, and those having a layered structure that allows for two-dimensional diffusion of lithium ions. Those having a spinel structure are generally expressed as LiMe₂O₄ (Me is at least one transition metal), and specific examples include LiMn₂O₄, LiCoMnO₄, LiNi_{0.5}Mn_{1.5}O₄, CoLiVO₄, and the like. Those that have a layered structure are generally expressed as LiMeO₂ (Me is at least one transition metal), and the following may be given as specific examples: LiCoO₂, LiNiO₂, LiNi_{1-x}Co_xO₂, LiNi_{1-x-y}Co_xMn_yO₂, LiNi_{0.5}Mn_{0.5}O₂, Li_{1.2}Cr_{0.4}Mn_{0.4}O₂, Li_{1.2}Cr_{0.4}Ti_{0.4}O₂, LiMnO₂, and the like. The second positive electrode active material (lithium transition metal compound powder) of the present invention is

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	preferably constituted by the inclusion of a crystal structure attributable to a layer structure. Among these, compounds containing a crystal structure attributable to a layered structure are particularly preferred. In addition, the second positive electrode active material (lithium transition metal compound powder) of the present invention may be introduced by different elements. The different element are selected from one or more type of any of: Na, Mg, Al, Si, K, Ca, Ti, V, Cr, Fe, Cu, Zn, Ga, Ge, Sr, Y, Zr, Nb, Ru, Rh, Pd, Ag, In, Sn, Sb, Te, Ba, Ta, Re, Os, Ir, Pt, Au, Pb, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, N, F, P, S, Cl, Br, and I. These different elements may be incorporated into the crystal structure of the lithium nickel manganese cobalt complex oxide, or may not be incorporated into the crystal structure of the lithium nickel manganese cobalt complex oxide, and may be unevenly distributed as a single body or a compound on the particle surface or the crystal grain boundary. The present invention characteristically uses at least one type selected from B and Bi for the additive element 1. Among these additive elements 1, it is preferable that the additive element 1 be B, since B is industrially available as a raw material at low cost, and is a light element. The type of compound (additive 1) containing the additive element 1 is not particularly limited so long as the effect of the present invention is expressed, however, normally, a boric acid or oxoacid salt, an oxide, hydroxide, or the like is used. Among these additive elements 1, boric acid and oxides are preferable from the standpoint of being industrially available as a raw material at low cost, and boric acid is particularly preferable. Example compounds of the additive 1 include: BO, B₂O₂, B₂O₃, B₄O₅, B₆O, B₇O, B₁₃O₂, LiBO₂, LiB₅O₈, Li₂B₄O₇, HBO₂, H₃BO₃, B(OH)₃, B(OH)₄, BiBO₃, Bi₂O₃, Bi₂O₅, Bi(OH)₃ and the like, wherein, from the standpoint of being industrially available as a raw material at a relatively low cost, B₂O₃, H₃BO₃, and Bi₂O₃ are given as preferable examples, and H₃BO₃ is given as a particularly preferable example. One type of these additives 1 may be used alone, or a blend of two or more types may be used. The present invention characteristically uses at least one type selected from Mo, W, Nb, Ta, and Re for the additive element 2. Among these additive elements 2, it is preferable that the additive element 2 be Mo or W, from the standpoint of a large effect, wherein W is most preferable. The type of compound (additive 2) containing the additive element 2 is not particularly limited so long as the effect of the present invention is expressed, however, normally, an oxide is used. Example compounds of the additive 2 include: MoO, MoO₂, MoO₃, MoO_x, Mo₂O₃, Mo₂O₅, Li₂MoO₄, WO, WO₂, WO₃, WO_x, W₂O₃, W₂O₅, W₁₈O₄₉, W₂₀O₅₈, W₂₄O₇₀, W₂₅O₇₃, W₄₀O₁₁₈, Li₂WO₄, NbONBO₂, Nb₂O₃, Nb₂O₅, Nb₂O₅·nH₂O, LiNbO₃, Ta₂O, Ta₂O₅, LiTaO₃, ReO₂, ReO₃, Re₂O₃, Re₂O₇, and the like, wherein MoO₃, Li₂MoO₄, WO₃, and Li₂WO₄, are preferable due to being industrially available as a raw material at a relatively low cost or due to including lithium, and WO₃ is particularly preferable. One type of these additives 2 may be used alone, or a blend of two or more types may be used. As far as the range of the total added amount of additive 1 and additive 2, suitably, with

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	respect to a total molar amount of the transition metal element configuring a primary component, the lower limit is normally 0.01 mol% or more, preferably 0.03 mol% or more, more preferably 0.04 mol% or more, and particularly preferably 0.05 mol% or more; and the upper limit is normally less than 2 mol%, preferably 1.9 mol% or less, more preferably 1.8 mol% or less, and particularly preferably 1.6 mol% or less. If the added amount is within the above range, the effect of the present invention can be readily obtained and is preferable. The range of the added ratio between the additive 1 and the additive 2 is, as a molar ratio, normally 10:1 or more and 1:40 or less, preferably 5:1 or more and 1:20 or less, more preferably 2:1 or more and 1:20 or less, and particularly preferably 1:1 or more and 1:10 or less. The effect of the present invention may be difficult to obtain when this range is deviated from. The lithium transition metal compound powder of the present invention characteristically has at least one type of element selected from elements derived from the additives (added elements), that is, B and Bi (added element 1), and Mo, W, Nb, Ta, and Re (added element 2). Specifically, the total molar ratio of the added element 1 to the total of the metal elements apart from Li, the added element 1, and the added element 2 (that is, metal elements other than Li, the added element 1, and the added element 2) is normally 20x the atomic ratio of the overall particles or more. The lower limit of this ratio is preferably 30x or more, more preferably 40x or more, and particularly preferably 50x or more. The upper limit is usually not particularly limited, but is preferably 500x or less, more preferably 400x or less, particularly preferably 300x or less, and most preferably 200x or less. When this ratio is too small, the effect of improving the physical properties of the powder is small, whereas when this ratio is too large, such may lead to deterioration of the battery performance. In addition, the molar ratio of the added element 2 to the total of the metal elements apart from Li, the added element 1, and the added element 2 (that is, metal elements other than Li, the added element 1, and the added element 2) is normally 3x the atomic ratio of the overall particles or more. The lower limit of this ratio is preferably 4x or more, more preferably 5x or more, and particularly preferably 6x or more. The upper limit is usually not particularly limited, but is preferably 150x or less, more preferably 100x or less, particularly preferably 50x or less, and most preferably 30x or less. If this ratio is too small, the effect of improving the battery properties is small, whereas if this ratio is too large, such may lead to deterioration of the battery performance.”). Ishigaki, ¶ [0183] (“In addition, a 90% cumulative diameter (D90) of the secondary particles of the second positive electrode active material (lithium transition metal compound powder) of the present invention is normally 30 μm or less, preferably 25 μm or less, more preferably 22 μm or less, and most preferably 20 μm or less; and normally 10 μm or more, preferably 11 μm or more, more preferably 12 μm or more, and most

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	preferably 13 μm or more. If the 90% cumulative diameter (D90) exceeds the upper limit, a reduction in battery performance may be brought about, whereas if the lower limit is exceeded, an issue may arise in the coating properties when forming the positive electrode active material layer.”). Ishigaki, ¶ [0193] (“<Composition> In addition, the second positive electrode active material (lithium transition metal compound powder) of the present invention is preferably a lithium transition metal system complex oxide powder represented by the following composition formula (I). $\text{LiMO}_2 \dots (\text{I})$ However, M is an element primarily composed of Li, Ni, and Mn, or Li, Ni, Mn, and Co, and the additive element 1 and the additive element 2 stated above, or an element different than the aforementioned, may be partially introduced. The molar ratio of Mn/Ni is normally 0.1 or more, preferably 0.3 or more, more preferably 0.5 or more, even more preferably 0.6 or more, even further preferably 0.7 or more, still more preferably 0.8 or more, and most preferably 0.9 or more; and normally 5 or less, preferably 4 or less, more preferably 3 or less, even more preferably 2.5 or less, and most preferably 1.5 or less. The molar ratio of Co/(Mn + Ni + Co) is normally 0 or more, preferably 0.01 or more, more preferably 0.02 or more, even more preferably 0.03 or more, and most preferably 0.05 or more; and normally 0.35 or less, preferably 0.20 or less, more preferably 0.15 or less, even more preferably 0.10 or less, and most preferably 0.099 or less. The molar ratio of Li in M is normally 0.001 or more, preferably 0.01 or more, more preferably 0.02 or more, even more preferably 0.03 or more, even further preferably 0.03 or more, and most preferably 0.05 or more; and normally 0.2 or less, preferably 0.19 or less, more preferably 0.18 or less, even more preferably 0.17 or less, and most preferably 0.15 or less.”). Ishigaki, ¶¶ [0197]-[0198] “<Preferred Composition> It is particularly preferable that the second positive electrode active material (lithium transition metal compound powder) of the present invention have an atomic structure at the M site in the composition formula (I) that is represented by formula (II) or formula (II’). $\text{M} = \text{Li}_z / (2+z) \{ (\text{Ni}(1+y) / 2 \text{Mn}(1-y) / 2) 1-x \text{Co}_x \} 2 / (2+z) \dots (\text{II})$ (However, In the above formula (II), $0 \leq x \leq 0.1$, $-0.1 \leq y \leq 0.1$, and $(1-x)(0.05-0.98y) \leq z \leq$

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	(1-x)(0.20-0.88y). $M = Li_{z'} / (2+z') \{ (Ni(1+y') / 2Mn(1-y') / 2) 1-x' Cox' \}^{2/(2+z')} \dots (II')$ (However, In the composition formula (II), $0.1 < x' \leq 0.35$, $-0.1 \leq y' \leq 0.1$, and $(1-x')(0.02-0.98y') \leq z' \leq (1-x')(0.20-0.88y')$”). Ishigaki, ¶¶ [0214]-[0215] (“(The reason is that the second positive electrode active material of the present invention (lithium transition metal compound powder) is preferable) (It is conceivable that, as follows, the reason is that the second positive electrode active material of the present invention (lithium transition metal compound powder) is preferable) That is, in the second positive electrode active material of the present invention (lithium transition metal compound powder), a crystalline secondary particle retains a spherical skeleton, the mercury intrusion amount is large where there is an increase in the mercury intrusion curve, and because the pore capacity between crystalline particle is great, the surface of contact between the positive electrode active material surface and the electrolyte solution can be caused to increase when this is used to produce a battery, and in addition, a surface state forms such as brings about an increase in the load characteristics (particularly reduced temperature output characteristics), an even higher degree of crystallinity is achieved, and the ratio of the presence of different phases is suppressed to an extremely low level, and is assumed to have a characteristic balance, which is excellent as a positive electrode active material, wherein powder handling properties are achieved. In addition, the reason that, in the second positive electrode active material of the invention of the present application (lithium transition metal compound powder), a lithium rechargeable battery having superior high density and high capacity is able to be achieved is that the lithium transition metal compound powder of the present application has, on the mercury intrusion curve via mercury intrusion porosimetry, a mercury intrusion amount when the pressure increases from 3.86 kPa to 413 MPa which is less than 0.4 cm³/g, or a pore distribution curve via mercury intrusion porosimetry whose main peak is present at a pore radius of 1,600 nm or more and 4,000 nm or less, and therefore, when an electrode is compacted, a high density can be achieved because a void amount necessary for penetrating the electrolyte solution can be ensured while unnecessary space is reduced on the other hand, and such is assumed to exhibit the effect of the present application.”). Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1)

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	was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press. The first layer was 35 μm thick and the second layer was 34 μm thick. The total weight of the mixture was 17 mg/cm^2, and the mixture density was 2.4 g/cm^3. A portion of the prepared positive electrode was used to perform an interface evaluation (measurement of the ratio and average depth of the recesses of the current collecting foil).”).
1[d]: wherein the first layer is arranged between the current collector and the second layer,	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “wherein the first layer is arranged between the current collector and the second layer,” The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f], beneath the cathode active material layers in the ATL 265066 Cell/Electrode, <i>i.e.</i>, the claimed second layer, to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. Ishigaki also discloses “wherein the first layer is arranged between the current collector and the second layer,”

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	For example, Ishigaki discloses that the first layer and second layer are sequentially laminated onto the current collector, followed by roll-pressing to compact the active material layers and form the electrode. <i>See, e.g.,</i>: Ishigaki, [Claim 7] (“The positive electrode for lithium rechargeable batteries according to any one of claims 1 through 6, wherein a first positive electrode mixture layer comprising a first positive electrode active material and a second positive electrode mixture layer comprising a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector.”). Ishigaki, ¶ [0014] (“(7) The positive electrode for lithium rechargeable batteries according to any one of (1) through (6), characterized in that a first positive electrode mixture layer containing a first positive electrode active material and “a second positive electrode mixture layer containing a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector.”). Ishigaki, ¶¶ [0141]-[0142] (“<Binder> In the present invention, the binder used in the production of the positive electrode active material layer is not particularly limited as long as it is commonly used, examples including resin polymers such as polyethylene, polypropylene, polyethylene terephthalate, polymethyl methacrylate, aromatic polyamide, cellulose, and nitrocellulose, rubber polymers such as SBR (styrene-butadiene rubber), NBR (acrylonitrile-butadiene rubber), fluororubber, isoprene rubber, butadiene rubber, and ethylene-propylene rubber, styrene-butadiene-styrene block copolymers and hydrogenated products thereof, thermoplastic elastomer polymers such as EPDM (ethylene-propylene-diene ternary copolymer), styrene-ethylene-butadiene-ethylene copolymers, styrene-isoprene styrene block copolymer, and hydrogenated products thereof, soft resinous polymers such as syndiotactic-1,2-polybutadiene, polyvinyl acetate, ethylene-vinyl acetate copolymers, and propylene-α-olefin copolymers, fluorine-based polymers such as polyvinylidene fluoride (PVdF), polytetrafluoroethylene, fluorinated polyvinylidene fluoride, and polytetrafluoroethylene-ethylene copolymers, polyacrylonitrile, and polymer compositions having ionic conductivity for alkali metal ions (particularly lithium ions). Among these, from the viewpoint of oxidation resistance, fluorine-based polymers such as polypropylene, SBR (styrene-butadiene rubber), polyacrylonitrile, polyvinylidene fluoride (PVdF), polytetrafluoroethylene, fluorinated polyvinylidene fluoride, and polytetrafluoroethylene-ethylene copolymers are preferred, with polyacrylonitrile,

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	polyvinylidene fluoride (PVdF), and SBR (styrene-butadiene rubber) being particularly preferred. Furthermore, from the viewpoint of adhesion to the current collecting foil, it is preferable that these polymers have functional groups that have affinity with the surface of the current collecting foil.”). Ishigaki, ¶ [0153] (“<Electrode Plate Laminate> Likewise, with a positive electrode for lithium rechargeable batteries—which is characterized by having laminated: a first positive electrode mixture layer containing a first positive electrode active material possessing the current collecting foil surface structure described above, and a second positive electrode mixture layer containing a second positive electrode active material whose particle diameter is larger than that of the first positive electrode active material—suitable performance can be obtained while safety is maintained, and is therefore preferable. Moreover, the positive electrode active material stated above may be used here for the first positive electrode mixture layer. Furthermore, the following lithium transition metal compound is preferable for the second positive electrode active material.”). Ishigaki, ¶ [0216] (“[METHOD FOR MANUFACTURING SECOND POSITIVE ELECTRODE ACTIVE MATERIAL (LITHIUM TRANSITION METAL COMPOUND POWDER)] The method for producing the second positive electrode active material (lithium transition metal compound powder) of the present invention is not limited to the defined production method, but may be suitably manufactured using a production method for a lithium transition metal compound powder for the lithium rechargeable battery positive electrode material described above. Note that the additives described above are used as the additives 1 and 2, and are mixed with the raw material in a slurry preparation step. [Ratio of Thickness of First Positive Electrode Active Material Layer and Second Positive Electrode Active Material Layer] The thickness ratio of the first positive electrode active material layer and the second positive electrode active material layer is normally 60:40, and because the second positive electrode active material has a higher bulk density than the first active material, in order to obtain a high energy density, the thickness ratio is preferably 70:30, more preferably 80:20, and particularly preferably 90:10.”). Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material,

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	conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press. The first layer was 35 μm thick and the second layer was 34 μm thick. The total weight of the mixture was 17 mg/cm^2, and the mixture density was 2.4 g/cm^3. A portion of the prepared positive electrode was used to perform an interface evaluation (measurement of the ratio and average depth of the recesses of the current collecting foil).”).
1[e]: the first layer is formed on a surface of the current collector, and	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “the first layer is formed on a surface of the current collector, and” The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f] to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. Ishigaki also discloses “the first layer is formed on a surface of the current collector, and” For example, Ishigaki discloses that the first layer is formed on a surface of the current collector, followed by the second layer being applied on top of the first layer, and then the sequentially-laminated layers are roll-pressed to form an electrode. <i>See, e.g.,</i>: Ishigaki, [Claim 7] (“The positive electrode for lithium rechargeable batteries according to any one of claims

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	1 through 6, wherein a first positive electrode mixture layer comprising a first positive electrode active material and a second positive electrode mixture layer comprising a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector.”). Ishigaki, ¶ [0014] (“(7) The positive electrode for lithium rechargeable batteries according to any one of (1) through (6), characterized in that a first positive electrode mixture layer containing a first positive electrode active material and a second positive electrode mixture layer containing a second positive electrode active material having a larger particle diameter than the first positive electrode active material are sequentially laminated and formed on the current collector.”). Ishigaki, ¶ [0141] (“<Binder> In the present invention, the binder used in the production of the positive electrode active material layer is not particularly limited as long as it is commonly used, examples including resin polymers such as polyethylene, polypropylene, polyethylene terephthalate, polymethyl methacrylate, aromatic polyamide, cellulose, and nitrocellulose, rubber polymers such as SBR (styrene-butadiene rubber), NBR (acrylonitrile-butadiene rubber), fluororubber, isoprene rubber, butadiene rubber, and ethylene-propylene rubber, styrene-butadiene-styrene block copolymers and hydrogenated products thereof, thermoplastic elastomer polymers such as EPDM (ethylene-propylene-diene ternary copolymer), styrene-ethylene-butadiene-ethylene copolymers, styrene-isoprene styrene block copolymer, and hydrogenated products thereof, soft resinous polymers such as syndiotactic-1,2-polybutadiene, polyvinyl acetate, ethylene-vinyl acetate copolymers, and propylene-α-olefin copolymers, fluorine-based polymers such as polyvinylidene fluoride (PVdF), polytetrafluoroethylene, fluorinated polyvinylidene fluoride, and polytetrafluoroethylene-ethylene copolymers, polyacrylonitrile, and polymer compositions having ionic conductivity for alkali metal ions (particularly lithium ions). Among these, from the viewpoint of oxidation resistance, fluorine-based polymers such as polypropylene, SBR (styrene-butadiene rubber), polyacrylonitrile, polyvinylidene fluoride (PVdF), polytetrafluoroethylene, fluorinated polyvinylidene fluoride, and polytetrafluoroethylene-ethylene copolymers are preferred, with polyacrylonitrile, polyvinylidene fluoride (PVdF), and SBR (styrene-butadiene rubber) being particularly preferred. Furthermore, from the viewpoint of adhesion to the current collecting foil, it is preferable that these polymers have functional groups that have affinity with the surface of the current collecting foil.”). Ishigaki, ¶ [0153] (“<Electrode Plate Laminate> Likewise, with a positive electrode for lithium rechargeable

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	batteries—which is characterized by having laminated: a first positive electrode mixture layer containing a first positive electrode active material possessing the current collecting foil surface structure described above, and a second positive electrode mixture layer containing a second positive electrode active material whose particle diameter is larger than that of the first positive electrode active material—suitable performance can be obtained while safety is maintained, and is therefore preferable. Moreover, the positive electrode active material stated above may be used here for the first positive electrode mixture layer. Furthermore, the following lithium transition metal compound is preferable for the second positive electrode active material.”). Ishigaki, ¶ [0216] (“[METHOD FOR MANUFACTURING SECOND POSITIVE ELECTRODE ACTIVE MATERIAL (LITHIUM TRANSITION METAL COMPOUND POWDER)] The method for producing the second positive electrode active material (lithium transition metal compound powder) of the present invention is not limited to the defined production method, but may be suitably manufactured using a production method for a lithium transition metal compound powder for the lithium rechargeable battery positive electrode material described above. Note that the additives described above are used as the additives 1 and 2, and are mixed with the raw material in a slurry preparation step. [Ratio of Thickness of First Positive Electrode Active Material Layer and Second Positive Electrode Active Material Layer] The thickness ratio of the first positive electrode active material layer and the second positive electrode active material layer is normally 60:40, and because the second positive electrode active material has a higher bulk density than the first active material, in order to obtain a high energy density, the thickness ratio is preferably 70:30, more preferably 80:20, and particularly preferably 90:10.”). Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF

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	polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press.”).
1[f]: a particle size of 90% accumulative volume of the first material is less than 40 μm ;	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “a particle size of 90% accumulative volume of the first material is less than 40 μm” The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f], beneath the cathode active material layers in the ATL 265066 Cell/Electrode, <i>i.e.</i>, the claimed second layer, to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. In addition, the ATL 265066 Cell/Electrode included lithium cobalt particles that, ~~upon information and belief,~~ had a particle size of 90% accumulative volume that was less than 40 μm.

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	PSD Results: 1,138 Particles from 3 Images $DV_{90}/DV_{10}=3.12$ DV90, 1.093, 90.90% DV50, 0.709, 50.23% DV10, 0.350, 10.00% Cumulative Volume Equivalent Spherical Diameter (μm) Ishigaki discloses and teaches inserting a first layer having smaller-diameter particles between the current collector and the second cathode active material layer having larger-diameter particles, as discussed herein. A POSA would have appreciated that, in the ATL 265066 Cell/Electrode, the cathode active material layer particles had a D90 of less than 40 μm, which, when combined with the teachings and disclosures of Ishigaki, which teaches smaller-size particles in the first layer applied to the current collector surface, would necessarily result in a first layer with a particle size of 90% accumulative volume less than 40 μm. Thus, the combined features of the ATL 265066 Cell/Electrode and Ishigaki render this limitation obvious for at least this additional reason. Ishigaki also discloses “a particle size of 90% accumulative volume of the first material is less than 40 μm,” For example, Ishigaki discloses that the first material has D90 values, as determined “by a well-known laser diffraction/scattering particle size distribution measuring device, with a set refractive index of 1.60a 0.10i, and a particle diameter standard as a volume standard,” that are normally 10 μm or less, preferably 8 μm or less, more preferably 6 μm or less, and most preferably 5 μm or less; and normally 0.5 μm or more, preferably 0.8 μm or more, more preferably 1 μm or more, and most preferably 1.5 μm or more, all of which satisfy the claim language reciting a particle size of 90% accumulative volume of the first material is less than 40 μm. See, e.g.,:

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	Ishigaki, ¶¶ [0038]-[0039] (“In addition, a 90% cumulative diameter (D90) of the secondary particles of the lithium transition metal compound powder of the present invention is normally 10 μm or less, preferably 8 μm or less, more preferably 6 μm or less, and most preferably 5 μm or less; and normally 0.5 μm or more, preferably 0.8 μm or more, more preferably 1 μm or more, and most preferably 1.5 μm or more. If the 90% cumulative diameter (D90) exceeds the upper limit, a reduction in battery performance may be brought about, whereas if the lower limit is exceeded, an issue may arise in the coating properties when forming the positive electrode active material layer. Note that, in the present invention, the median diameter, as the average particle diameter, and the 90% cumulative diameter (D90) are measured by a well-known laser diffraction/scattering particle size distribution measuring device, with a set refractive index of 1.60a 0.10i, and a particle diameter standard as a volume standard. In the present invention, for the dispersion medium used during measurement, measurement was performed using a 0.1 wt% sodium hexametaphosphate aqueous solution.”). Ishigaki, ¶ [0014] (“(4) The positive electrode for lithium rechargeable batteries according to any one of (1) through (3), characterized in that a volume ratio of the positive electrode active material having a particle diameter of 5 μm or more is 10 vol% or less.”). Ishigaki, ¶ [0040] (“<Positive Electrode Active Material with Particle Diameter of 5 μm or More> It is preferable that the active material having a particle size of 5 μm or more at the positive electrode preparation stage of the lithium transition metal compound powder of the present invention is 10 vol% or less, and since particles having a large particle diameter are likely to form recesses, the upper limit is preferably 10 vol% or less, more preferably 8 vol% or less, and particularly preferably 5 vol% or less. The lower limit is not particularly limited, but since production of uniform particles having a small particle diameter is expensive, it is preferably 1 vol% or more, more preferably 1.5 vol% or more, and particularly preferably 2 vol% or more.”). Ishigaki, ¶ [0346] (“Next, this slurry (solid content: 50% by mass) was spray-dried using a four-fluid nozzle type spray dryer (made by Fujisaki Electric Co., Ltd.: MDP-50 model). Furthermore, the drying inlet temperature was set to 200°C. A particulate powder obtained by spray drying using a spray dryer had a median diameter of 7 μm. This powder was calcined in an air atmosphere at 650°C for 2 hours (temperature increase/decrease rate 7.7°C/min), and then further calcined at 1050°C for 2.5 hours (temperature

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	increase/decrease rate 7.7°C/min), and then crushed to obtain a lithium nickel manganese cobalt composite oxide (x = 0.1, y = 0.00, z = 0.12) having a layered structure of composition Li _{1.12} (Ni _{0.45} Mn _{0.45} Co _{0.10})O ₂ . The lithium nickel manganese cobalt composite oxide as synthesized had an average primary particle diameter of 1 μm, a median size of 2.0 μm, an accumulated percentage of particles with a particle diameter of 5 μm or more of 4.4%, a bulk density of 1.1 g/cc, and a BET specific surface area of 2.6 m ² /g.”).														
1[g]: wherein a total compaction density of the first layer and the second layer is greater than 3.2 g/cc.	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “wherein a total compaction density of the first layer and the second layer is greater than 3.2 g/cc.” For example, the ATL 265066 Cell/Electrode comprises a cathode active material layer that, ~~upon information and belief,~~ is compressed to a compaction density of greater than 3.2 g/cc. Table 6: Electrode Compaction Density <table><tr><th>Sample ID</th><th>Weight of electrode (g)</th><th>Weight of current collector (g)</th><th>Area of electrode (cm²)</th><th>Thickness of electrode (cm)</th><th>Thickness of current collector (cm)</th><th>Electrode compaction density (g/cm³)</th></tr><tr><td>123124-002 Cathode</td><td>0.18134</td><td>0.04831</td><td>4.4871</td><td>0.01219</td><td>0.00483</td><td>4.02</td></tr></table> Moreover, a POSA would have understood that a total compaction density of greater than 3.2 g/cc would have been an obvious target when combining the ATL 265066 Cell/Electrode with Ishigaki’s disclosures and teachings. For example, Ishigaki discloses “wherein a total compaction density of the first layer and the second layer is greater than 3.2 g/cc.” For example, Ishigaki discloses that the first and second layers are sequentially laminated onto the current collector, and then press-rolled to form an electrode having a compaction density greater than 3.2 g/cc. See, e.g.,: Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a	Sample ID	Weight of electrode (g)	Weight of current collector (g)	Area of electrode (cm ²)	Thickness of electrode (cm)	Thickness of current collector (cm)	Electrode compaction density (g/cm ³)	123124-002 Cathode	0.18134	0.04831	4.4871	0.01219	0.00483	4.02
Sample ID	Weight of electrode (g)	Weight of current collector (g)	Area of electrode (cm ²)	Thickness of electrode (cm)	Thickness of current collector (cm)	Electrode compaction density (g/cm ³)									
123124-002 Cathode	0.18134	0.04831	4.4871	0.01219	0.00483	4.02									

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	small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight 10 ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press.”). Ishigaki, ¶¶ [0024]-[0025] (“The positive electrode active material layer is usually produced by dry-mixing a conductive material, a positive electrode active material, a binder, and further, a thickener or the like as necessary into a sheet form, which is then pressed onto the positive electrode current collecting foil, or these materials are usually dissolved or dispersed in a liquid medium such as an organic solvent to form a slurry, which is then coated on the positive electrode current collecting foil and dried. Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a hand press, a roller press, or the like in order to increase the packing density of the positive electrode active material. The upper limit is not particularly limited, but since space is required in the positive electrode plate to hold the electrolyte in the electrode plate and to supply lithium ions, the upper limit is preferably 3.6 g/cm³ or less, more preferably 3.5 g/cm³ or less, and particularly preferably 3.4 g/cm³ or less.”). Ishigaki discloses that the positive electrode after pressing has a compaction density that has a lower limit of normally 2.0 g/cm³ or more, preferably 2.4 g/cm³ or more, and particularly preferably 2.6 g/cm³ or more, and an upper limit of normally 4.2 g/cm³ or less, preferably 4.0 g/cm³ or less, and particularly preferably 3.8 g/cm³ or less, all of which satisfy the claim language that the electrode compaction density is greater than 3.2 g/cc. See, e.g., Ishigaki, ¶ [0151] (“Furthermore, the thickness of the positive electrode active material layer is usually about 10 to 200 μm. The electrode density of the positive electrode after pressing has a lower limit of normally 2.0 g/cm³ or more, preferably 2.4 g/cm³ or more, and particularly preferably 2.6

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	g/cm³ or more, and an upper limit of normally 4.2 g/cm³ or less, preferably 4.0 g/cm³ or less, and particularly preferably 3.8 g/cm³ or less. Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a roller press or the like in order to increase the packing density of the positive electrode active material. Thus, the positive electrode for lithium rechargeable batteries of the present invention can be prepared.”). To the extent that ATL contends that Ishigaki’s “electrode density” refers to the density of the entire electrode (including the current collector and active material layers), a POSA would have understood that Ishigaki necessarily and inherently discloses “a total compaction density of the first layer and the second layer is greater than 3.2 g/cc.” For example, even if Ishigaki’s “electrode density” values include the positive current collector material, aluminum foil, that current collector material has a known density of 2.7 g/cm³. Therefore, Ishigaki’s “electrode density” values that range up to 4.2 g/cm³ necessarily include active material layers that have total compaction density greater than 3.2 g/cm³ because of the less-dense aluminum foil current collector material. To the extent that ATL contends that compaction density greater than 3.2 g/cm³ was critical to the alleged inventions of the ’118 patent, such a contention lacks merit. For example, the ’118 patent mentions compaction density greater than 3.2 g/cm³ only once, without discussion of higher or lower compaction density or any explanation of why that particular value or range makes a difference to the alleged invention. ’118, 6:25-27. Nevertheless, a POSA would have been motivated to combine the ATL 265066 Cell/Electrode with the disclosures and teachings of Ishigaki to target a compaction density of greater than 3.2 g/cm³. The ATL 265066 Cell/Electrode and Ishigaki are analogous as each is related to electrode active material layer(s) and their structures and compositions in lithium-ion batteries. The ATL 265066 Cell/Electrode and Ishigaki provide overlapping disclosures of the electrode active material layer(s), including, ~~upon information and belief,~~ their compositions and manufacturing processes. Moreover, Ishigaki teaches that a compaction density of greater than 3.2 g/cm³ “achieves high safety.” See, e.g., Ishigaki, ¶ [0152] (“<Reasons the Present Invention Provides the Above-mentioned Effects> Reasons why the present invention provides the above-mentioned effects are believed to be as follows. That is, by controlling the shape between the mixture and the current collecting foil to have few recesses as specified in the claims of the present application, it is expected the electrode plate of the present invention achieves high safety by generating resistance at the

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	interface between the mixture layer and the current collecting foil, limiting short circuit current in the event of an internal short circuit, and suppressing heat generation. In particular, because the active material used in the present invention is a highly uniform fine particle material, the shape described above may be realized using a same electrode manufacturing method as is used conventionally, and the capacity and output are presumed to be favorable.”). Ishigaki likewise relates to electrode active material layers for use in lithium batteries that are pressed to advantageous compaction densities. <i>See, e.g.</i>, Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight 10 ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press.”). Ishigaki, ¶ [0024] (“The positive electrode active material layer is usually produced by dry-mixing a conductive material, a positive electrode active material, a binder, and further, a thickener or the like as necessary into a sheet form, which is then pressed onto the positive electrode current collecting foil, or these materials are usually dissolved or dispersed in a liquid medium such as an organic solvent to form a slurry, which is then coated on the positive electrode current collecting foil and dried. Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a hand press, a roller press, or the like in order to increase the packing density of the positive electrode active material.”).

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	Ishigaki, ¶ [0025] (“The upper limit is not particularly limited, but since space is required in the positive electrode plate to hold the electrolyte in the electrode plate and to supply lithium ions, the upper limit is preferably 3.6 g/cm³ or less, more preferably 3.5 g/cm³ or less, and particularly preferably 3.4 g/cm³ or less.”). Ishigaki discloses that the positive electrode after pressing has a compaction density that has a lower limit of normally 2.0 g/cm³ or more, preferably 2.4 g/cm³ or more, and particularly preferably 2.6 g/cm³ or more, and an upper limit of normally 4.2 g/cm³ or less, preferably 4.0 g/cm³ or less, and particularly preferably 3.8 g/cm³ or less, all of which satisfy the claim language that the electrode compaction density is greater than 3.2 g/cc. <i>See, e.g.</i>, Ishigaki, ¶ [0151] (“Furthermore, the thickness of the positive electrode active material layer is usually about 10 to 200 µm. The electrode density of the positive electrode after pressing has a lower limit of normally 2.0 g/cm³ or more, preferably 2.4 g/cm³ or more, and particularly preferably 2.6 g/cm³ or more, and an upper limit of normally 4.2 g/cm³ or less, preferably 4.0 g/cm³ or less, and particularly preferably 3.8 g/cm³ or less. Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a roller press or the like in order to increase the packing density of the positive electrode active material. Thus, the positive electrode for lithium rechargeable batteries of the present invention can be prepared.”). A POSA would have had a reasonable expectation of success in combining the ATL 265066 Cell/Electrode with the disclosures and teachings of Ishigaki. A POSA would have understood that combining the ATL 265066 Cell/Electrode and Ishigaki would have involved the exercise of ordinary skill, with predictable results. A POSA would have appreciated that the ATL 265066 Cell/Electrode already had a compaction density of greater than 3.2 g/cc, and within Ishigaki’s range of total compaction density. Thus, the ATL 265066 Cell/Electrode achieved a compaction density that allowed for increased packing density of the particles in the cathode active material layer, high energy density, and increased battery capacity, as confirmed by Ishigaki’s disclosures and teachings. A POSA would have expected success in achieving a total compaction density greater than 3.2 g/cc because, ~~upon information and belief,~~ the ATL 265066 Cell/Electrode and Ishigaki both involve the use of well-known and predictable calendaring processes, such as using a roll press, to press electrode active material layers to achieve a specific compaction density target. Ishigaki, ¶ [0366] (“[Example 2] (Production of one-sided positive electrode 4) As the active material of the positive electrode for the first layer, (active material 1) was used. The active material (active material 1) was stirred in a planetary centrifugal mixer (AR300, made by Thinky) and subjected to shearing to obtain a

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	small particle diameter positive electrode active material (lithium nickel manganese cobalt composite oxide) with a median diameter of 1.7 μm at the positive electrode preparation stage. The active material, conductive material (HS100 made by Denki Kagaku Kogyo), and binder PVdF (Kureha Corporation: KF Polymer L#1120) were weighed and mixed in a weight 10 ratio of 87:8 (as solid content):5, and N-methylpyrrolidone (NMP) was further added so that the solid content ratio was 45% by mass, and a uniform slurry 1 was prepared using a planetary centrifugal mixer. As the active material of the positive electrode for the second layer, (active material 3) was used. This active material: L#1120 of HS100:KF polymer was weighed and mixed so that the weight ratio was 85:10 (as solid content):5, and then NMP was added so that the solid content ratio was 45% by mass, and a uniform slurry 2 was made using a rotation and revolution type mixer. Next, the slurry 1 was applied and dried on one side of aluminum foil (thickness 15 μm) of the current collecting foil using a doctor blade. Then, the slurry 2 was applied to one side of the substrate using a doctor blade and dried. This coating film was made into a test positive electrode using a roll press.”); Ishigaki, ¶ [0024] (“The positive electrode active material layer is usually produced by dry-mixing a conductive material, a positive electrode active material, a binder, and further, a thickener or the like as necessary into a sheet form, which is then pressed onto the positive electrode current collecting foil, or these materials are usually dissolved or dispersed in a liquid medium such as an organic solvent to form a slurry, which is then coated on the positive electrode current collecting foil and dried. Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a hand press, a roller press, or the like in order to increase the packing density of the positive electrode active material.”).
2: The electrode according to claim 1, wherein a thickness of the first layer is not less than the particle size of 90% accumulative volume of the first material in the first layer.	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “wherein a total compaction density of the first layer and the second layer is greater than 3.2 g/cc.” The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f], beneath the cathode active material layers in the ATL 265066 Cell/Electrode, <i>i.e.</i>, the claimed second layer, to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. Combining the ATL 265066 Cell/Electrode and Ishigaki would also disclose or render obvious the subject matter of this claim.

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	Ishigaki also discloses “[t]he electrode according to claim 1, wherein a thickness of the first layer is not less than the particle size of 90% accumulative volume of the first material in the first layer.” For example, Ishigaki discloses that the first layer is usually about 10 to 200 μm thick, which is not less than the particle size of 90% accumulative volume of the first material in the first layer (D90), which is normally 10 μm or less, preferably 8 μm or less, more preferably 6 μm or less, and most preferably 5 μm or less; and normally 0.5 μm or more, preferably 0.8 μm or more, more preferably 1 μm or more, and most preferably 1.5 μm or more. <i>See, e.g.,</i>: Ishigaki, ¶ [0025] (“The thickness of the positive electrode active material layer is usually about 10 to 200 μm.”). Ishigaki, ¶ [0151] (“Furthermore, the thickness of the positive electrode active material layer is usually about 10 to 200 μm.”). Ishigaki, ¶ [0014] (“(4) The positive electrode for lithium rechargeable batteries according to any one of (1) through (3), characterized in that a volume ratio of the positive electrode active material having a particle diameter of 5 μm or more is 10 vol% or less.”). Ishigaki, ¶¶ [0038]-[0039] (“In addition, a 90% cumulative diameter (D90) of the secondary particles of the lithium transition metal compound powder of the present invention is normally 10 μm or less, preferably 8 μm or less, more preferably 6 μm or less, and most preferably 5 μm or less; and normally 0.5 μm or more, preferably 0.8 μm or more, more preferably 1 μm or more, and most preferably 1.5 μm or more. If the 90% cumulative diameter (D90) exceeds the upper limit, a reduction in battery performance may be brought about, whereas if the lower limit is exceeded, an issue may arise in the coating properties when forming the positive electrode active material layer. Note that, in the present invention, the median diameter, as the average particle diameter, and the 90% cumulative diameter (D90) are measured by a well-known laser diffraction/scattering particle size distribution measuring device, with a set refractive index of 1.60a 0.10i, and a particle diameter standard as a volume standard. In the present invention, for the dispersion medium used during measurement, measurement was performed using a 0.1 wt% sodium hexametaphosphate aqueous solution.”).

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Claim	Corresponding Prior Art Disclosures
3: The electrode according to claim 1, wherein a ratio of the average particle size of the second material to the average particle size of the first material is from 1:1 to 40:1.	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “[t]he electrode according to claim 1, wherein a ratio of the average particle size of the second material to the average particle size of the first material is from 1:1 to 40:1.” The ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f]. Nevertheless, it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f], beneath the cathode active material layers in the ATL 265066 Cell/Electrode, <i>i.e.</i>, the claimed second layer, to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. Combining the ATL 265066 Cell/Electrode and Ishigaki would also disclose or render obvious the subject matter of this claim. Ishigaki also discloses “[t]he electrode according to claim 1, wherein a ratio of the average particle size of the second material to the average particle size of the first material is from 1:1 to 40:1.” For example, the ’118 patent defines “average particle size” as Dv50, also known as the median particle diameter, which “refers to a particle size that reaches a volume accumulation of 50% from the small particle size side in a volume-based granularity distribution.” ’118, 1:61-64. Ishigaki also defines average particle diameter as median particle diameter. <i>See, e.g.</i>,: Ishigaki, ¶ [0089] (“Note that it is preferable that the raw materials are pulverized in parallel with the mixing step of the raw materials. The degree of pulverization is indicated by the particle diameter of the raw material particles after pulverization, and the average particle diameter (median diameter) is normally 0.4 μm or less, preferably 0.3 μm or less, more preferably 0.25 μm or less, and most preferably 0.2 μm or less. When the average particle diameter of the raw material particles after pulverization is too large, not only will the reactivity in the firing step decrease, but it will also be difficult to achieve a uniform composition. However, making the particles smaller than necessary leads to increased costs for pulverization, so pulverization should be carried out so that the average particle diameter is normally 0.01 μm or more, preferably 0.02 μm or more, and more preferably 0.05 μm or more. The means for achieving such a degree of pulverization is not particularly limited, but a wet pulverization method is preferred. Specifically, a Dyno

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	Mill may be mentioned.”). Ishigaki discloses that the average particle sizes of the first material are normally 0.1 μm or more, preferably 0.3 μm or more, more preferably 0.6 μm or more, even more preferably 0.8 μm or more, and most preferably 1.2 μm or more; and normally 5 μm or less, preferably 4 μm or less, more preferably 3 μm or less, even more preferably 2.8 μm or less, and most preferably 2.5 μm or less. <i>See, e.g.</i>, Ishigaki, ¶ [0037] (“The median diameter at the positive electrode preparation stage of the lithium transition metal compound powder of the present invention is normally 0.1 μm or more, preferably 0.3 μm or more, more preferably 0.6 μm or more, even more preferably 0.8 μm or more, and most preferably 1.2 μm or more; and normally 5 μm or less, preferably 4 μm or less, more preferably 3 μm or less, even more preferably 2.8 μm or less, and most preferably 2.5 μm or less. So long as the median diameter is within this range, the coating property during the formation of the positive electrode active material layer is favorable, and the ratio of recessed portions per unit area of the current collecting foil is low, so that safety against internal short circuits is high.”). Ishigaki discloses that the average particle sizes of the second material are normally 6 μm or more, preferably 7 μm or more, more preferably 8 μm or more, and most preferably 9 μm or more; and normally 20 μm or less, preferably 19 μm or less, more preferably 18 μm or less, even more preferably 17 μm or less, and most preferably 15 μm or less. <i>See, e.g.</i>, Ishigaki, ¶ [0182] (“<Median Diameter and 90% Cumulative Diameter (D90)> The median diameter of the second positive electrode active material (lithium transition metal compound powder) of the present invention is normally 6 μm or more, preferably 7 μm or more, more preferably 8 μm or more, and most preferably 9 μm or more; and normally 20 μm or less, preferably 19 μm or less, more preferably 18 μm or less, even more preferably 17 μm or less, and most preferably 15 μm or less. When the median diameter falls below this lower limit, there is a possibility of an issue arising in coating properties when forming a positive electrode active material layer, and when the upper limit is exceeded, there is a possibility of the battery properties being reduced.”). Thus, the second material has larger average particle sizes compared to the first material, so the ratio of the average particle sizes of the two materials is greater than 1:1. Taking as an example Ishigaki’s most-preferred ranges, <i>i.e.</i>, 1.2 μm to 2.5 μm (first material) and 9 μm to 15 μm (second material), Ishigaki discloses a ratio of the average particle size of the second material to the average particle size of the first material that ranges from a maximum of 12.5:1 (15 μm (the upper end of Ishigaki’s most-preferred range for the second material’s median particle diameter) divided by 1.2 μm (the lower end of Ishigaki’s

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	most-preferred range for the first material's median particle diameter)) to a minimum of 3.6:1 (9 μm (the lower end of Ishigaki's most-preferred range for the second material's median particle diameter) divided by 2.5 μm (the upper end of Ishigaki's most-preferred range for the first material's median particle diameter)), both of which fall within the claimed range of 1:1 to 40:1.
4: The electrode according to claim 1, wherein the first material has an average particle size in a range of 0.2 μm to 15 μm.	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “[t]he electrode according to claim 1, wherein the first material has an average particle size in a range of 0.2 μm to 15 μm.” Even if the ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f], it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f] to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki's teachings and disclosures, for the reasons discussed above for claim 1[b]. Combining the ATL 265066 Cell/Electrode and Ishigaki would also disclose or render obvious the subject matter of this claim. Ishigaki also discloses “[t]he electrode according to claim 1, wherein the first material has an average particle size in a range of 0.2 μm to 15 μm.” For example, the '118 patent defines “average particle size” as Dv50, also known as the median particle diameter, which “refers to a particle size that reaches a volume accumulation of 50% from the small particle size side in a volume-based granularity distribution.” '118, 1:61-64. Ishigaki also defines average particle diameter as median particle diameter. <i>See, e.g.,</i>: Ishigaki, ¶ [0089] (“Note that it is preferable that the raw materials are pulverized in parallel with the mixing step of the raw materials. The degree of pulverization is indicated by the particle diameter of the raw material particles after pulverization, and the average particle diameter (median diameter) is normally 0.4 μm or less, preferably 0.3 μm or less, more preferably 0.25 μm or less, and most preferably 0.2 μm or less. When the average particle diameter of the raw material particles after pulverization is too large, not only will the reactivity in the firing step decrease, but it will also be difficult to achieve a uniform composition. However, making the particles smaller than necessary leads to increased costs for pulverization, so pulverization should be carried out so that the average particle diameter is normally 0.01 μm or more,

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	preferably 0.02 μm or more, and more preferably 0.05 μm or more. The means for achieving such a degree of pulverization is not particularly limited, but a wet pulverization method is preferred. Specifically, a Dyno Mill may be mentioned.”). Ishigaki discloses that the average particle sizes of the first material are normally 0.1 μm or more, preferably 0.3 μm or more, more preferably 0.6 μm or more, even more preferably 0.8 μm or more, and most preferably 1.2 μm or more; and normally 5 μm or less, preferably 4 μm or less, more preferably 3 μm or less, even more preferably 2.8 μm or less, and most preferably 2.5 μm or less, resulting in average particle sizes that fall within and overlap the claimed range of 0.2 μm to 15 μm. <i>See, e.g.</i>, Ishigaki, ¶ [0037] (“The median diameter at the positive electrode preparation stage of the lithium transition metal compound powder of the present invention is normally 0.1 μm or more, preferably 0.3 μm or more, more preferably 0.6 μm or more, even more preferably 0.8 μm or more, and most preferably 1.2 μm or more; and normally 5 μm or less, preferably 4 μm or less, more preferably 3 μm or less, even more preferably 2.8 μm or less, and most preferably 2.5 μm or less. So long as the median diameter is within this range, the coating property during the formation of the positive electrode active material layer is favorable, and the ratio of recessed portions per unit area of the current collecting foil is low, so that safety against internal short circuits is high.”).
6: The electrode according to claim 1, wherein the first layer has a lower compaction density than the second layer.	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “[t]he electrode according to claim 1, wherein the first layer has a lower compaction density than the second layer.” Even if the ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f], it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f] to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. Combining the ATL 265066 Cell/Electrode and Ishigaki would also disclose or render obvious the subject matter of this claim. Ishigaki also discloses “[t]he electrode according to claim 1, wherein the first layer has a lower compaction density than the second layer.” For example, Ishigaki discloses that the second positive electrode active material has a higher bulk density

Claim	Corresponding Prior Art Disclosures
	relative to the first active material. <i>See, e.g.,</i>: Ishigaki, ¶ [0216] (“The thickness ratio of the first positive electrode active material layer and the second positive electrode active material layer is normally 60:40, and because the second positive electrode active material has a higher bulk density than the first active material, in order to obtain a high energy density, the thickness ratio is preferably 70:30, more preferably 80:20, and particularly preferably 90:10.”). Ishigaki, ¶ [0100] (“Furthermore, the bulk density of the spray-dried powder of the lithium transition metal compound powder such as the lithium nickel manganese cobalt complex oxide powder of the present invention is normally 0.1 g/cc or more, preferably 0.3 g/cc or more, more preferably 0.5 g/cc or more, and most preferably 0.7 g/cc or more. Below this lower limit, there is a possibility that the powder packing property and the powder handling are adversely affected, and the density is normally 1.7 g/cc or less, preferably 1.6 g/cc or less, more preferably 1.5 g/cc or less, and most preferably 1.4 g/cc or less. A bulk density exceeding this upper limit is preferable for powder packing properties and powder handling, but may result in an excessively low specific surface area, which may result in reduced reactivity in the firing step.”). Ishigaki, ¶ [0181] (“The bulk density of the second positive electrode active material (lithium transition metal compound powder) of the present invention is normally 2.1 g/cc or more, preferably 2.2 g/cc or more, more preferably 2.3 g/cc or more, and most preferably 2.4 g/cc or more; and normally 3.0 g/cc or less, preferably 2.9 g/cc or less, more preferably 2.8 g/cc or less, and most preferably 2.7 g/cc or less. A bulk density exceeding this upper limit is preferable for improving powder packing properties and electrode density, but may result in an excessively low specific surface area, which may result in reduced battery performance. When the bulk density falls below this lower limit, there is a possibility of the powder packing properties and electrode preparation being adversely affected.”). Ishigaki discloses that the roller press compacts the positive electrode active material layers to increase their packing density. Ishigaki, ¶ [0024] (“Note that the positive electrode active material layer obtained by coating and drying is preferably compressed by a hand press, a roller press, or the like in order to increase the packing density of the positive electrode active material.”), ¶ [0151] (same). Thus, Ishigaki discloses that the first layer had a lower compaction density relative to the second layer because Ishigaki discloses that the pressing process increases both layers’ packing densities.

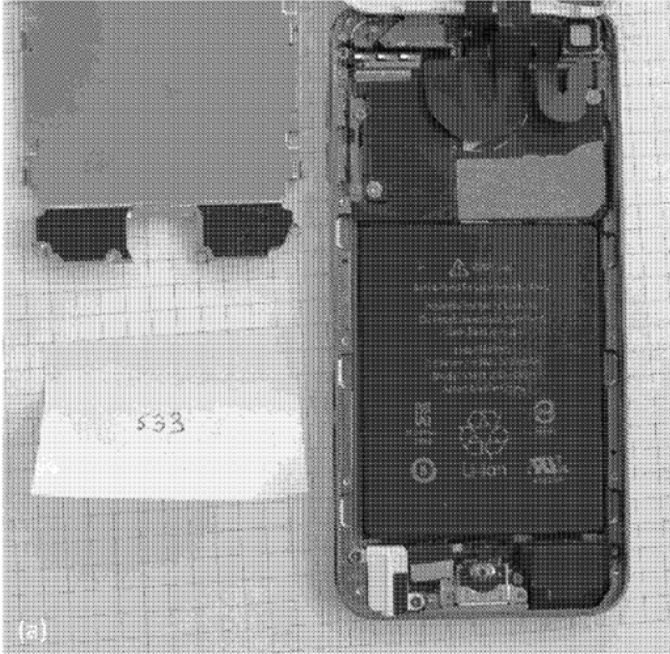
Claim	Corresponding Prior Art Disclosures
7: The electrode according to claim 1, wherein the first material comprises one selected from the group consisting of lithium cobaltate, lithium manganate, lithium nickelate, lithium nickel cobalt manganese oxide, lithium iron phosphate, lithium iron manganese phosphate, lithium vanadium phosphate, lithium vanadyl phosphate, lithium-rich manganese-based materials, lithium nickel cobalt aluminate and lithium titanate, and combinations thereof.	The ATL 265066 Cell/Electrode and Ishigaki disclose or at least render obvious “The electrode according to claim 1, wherein the first material comprises one selected from the group consisting of lithium cobaltate, lithium manganate, lithium nickelate, lithium nickel cobalt manganese oxide, lithium iron phosphate, lithium iron manganese phosphate, lithium vanadium phosphate, lithium vanadyl phosphate, lithium-rich manganese-based materials, lithium nickel cobalt aluminate and lithium titanate, and combinations thereof.” Even if the ATL 265066 Cell/Electrode does not comprise “a first layer comprising a first material” as defined by claim 1[b], 1[d], 1[e], and 1[f], it would have been obvious to a POSA to apply “a first layer comprising a first material,” as defined by claim 1[b], 1[d], 1[e], and 1[f] to achieve, among other things, better adhesion of a cathode active material layer to the current collector, increased safety to guard against internal short circuits, and lower cost, based on Ishigaki’s teachings and disclosures, for the reasons discussed above for claim 1[b]. Combining the ATL 265066 Cell/Electrode and Ishigaki would also disclose or render obvious the subject matter of this claim. Ishigaki discloses “[t]he electrode according to claim 1, wherein the first material comprises one selected from the group consisting of lithium cobaltate, lithium manganate, lithium nickelate, lithium nickel cobalt manganese oxide, lithium iron phosphate, lithium iron manganese phosphate, lithium vanadium phosphate, lithium vanadyl phosphate, lithium-rich manganese-based materials, lithium nickel cobalt aluminate and lithium titanate, and combinations thereof.” For example, Ishigaki discloses that the first material may comprise, for example, lithium cobaltate (LiCoO_2), lithium manganate (LiMn_2O_4), lithium nickelate (LiNiO_2), lithium nickel cobalt manganese oxide ($\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$), lithium iron phosphate (LiFePO_4), or “lithium-rich manganese-based materials” (<i>e.g.</i>, LiMnPO_4, LiMn_2O_4, LiCoMnO_4, $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$, $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$, $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Mn}_{0.4}\text{O}_2$, or LiMnO_2). <i>See, e.g.</i>, Ishigaki, ¶ [0027] (“<Lithium Transition Metal Compound> In the present invention, a ‘lithium transition metal compound’ is a compound having a structure capable of removing and inserting a Li ion, and examples thereof include sulfides, phosphate compounds, lithium transition metal complex oxides, and the like. Examples of sulfides include compounds with two-dimensional layered structures such as TiS_2 and MoS_2, and Chevrel compounds with strong three-dimensional framework structures expressed by the general

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	formula $\text{Me}_x\text{Mo}_6\text{S}_8$ (Me is any transition metal including Pb, Ag, and Cu). Examples of phosphate compounds include those that belong to an olivine structure, which are generally expressed as LiMePO_4 (Me being at least one or more transition metals), and specific examples include LiFePO_4, LiCoPO_4, LiNiPO_4, LiMnPO_4 and the like. Examples of lithium transition metal complex oxides include those having a spinel structure that allows for three-dimensional diffusion, and those having a layered structure that allows for two-dimensional diffusion of lithium ions. Those having a spinel structure are generally expressed as LiMe_2O_4 (Me is at least one or more transition metals), and specific examples include LiMn_2O_4, LiCoMnO_4, $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$, CoLiVO_4, and the like. Those that have a layered structure are generally expressed as LiMeO_2 (Me is at least one or more transition metals), and the following may be given as specific examples: LiCoO_2, LiNiO_2, $\text{LiNi}_{1-x}\text{Co}_x\text{O}_2$, $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$, $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Mn}_{0.4}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Ti}_{0.4}\text{O}_2$, LiMnO_2.”).
8: The electrode according to claim 1, wherein the second material comprises one selected from the group consisting of lithium cobaltate, lithium nickel cobalt manganese oxide, lithium nickel cobalt aluminum oxide, lithium-rich manganese-based material, lithium iron phosphate, and combinations thereof.	The ATL 265066 Cell/Electrode discloses “[t]he electrode according to claim 1, wherein the second material comprises one selected from the group consisting of lithium cobaltate, lithium nickel cobalt manganese oxide, lithium nickel cobalt aluminum oxide, lithium-rich manganese-based material, lithium iron phosphate, and combinations thereof.” For example, the ATL 265066 Cell/Electrode comprises a cathode active material layer that, ~~upon information and belief,~~ comprises lithium cobalt. Likewise, Ishigaki discloses “[t]he electrode according to claim 1, wherein the second material comprises one selected from the group consisting of lithium cobaltate, lithium nickel cobalt manganese oxide, lithium nickel cobalt aluminum oxide, lithium-rich manganese-based material, lithium iron phosphate, and combinations thereof.” For example, Ishigaki discloses that the second material may comprise, for example, lithium cobaltate (LiCoO_2), lithium nickel cobalt manganese oxide ($\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$), lithium iron phosphate (LiFePO_4), or “lithium-rich manganese-based materials” (<i>e.g.</i>, LiMnPO_4, LiMn_2O_4, LiCoMnO_4, $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$, $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$, $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Mn}_{0.4}\text{O}_2$, or LiMnO_2). <i>See, e.g.</i>,: Ishigaki, ¶ [0156] (“<Lithium Transition Metal Compound> The second positive electrode active material (lithium transition metal compound) of the present invention is a compound having a structure capable of

Claim	Corresponding Prior Art Disclosures
	removing and inserting a Li ion, and examples thereof include sulfides, phosphate compounds, lithium transition metal complex oxides, and the like. Examples of sulfides include compounds with two-dimensional layered structures such as TiS_2 and MoS_2, and Chevrel compounds with strong three-dimensional framework structures expressed by the general formula $\text{Me}_x\text{Mo}_6\text{S}_8$ (Me is any transition metal including Pb, Ag, and Cu). Examples of phosphate compounds include those that belong to an olivine structure, which are generally expressed as LiMePO_4 (Me being at least one or more transition metals), and specific examples include LiFePO_4, LiCoPO_4, LiNiPO_4, LiMnPO_4 and the like. Examples of lithium transition metal complex oxides include those having a spinel structure that allows for three-dimensional diffusion, and those having a layered structure that allows for two-dimensional diffusion of lithium ions. Those having a spinel structure are generally expressed as LiMe_2O_4 (Me is at least one or more transition metals), and specific examples include LiMn_2O_4, LiCoMnO_4, $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$, CoLiVO_4, and the like. Those that have a layered structure are generally expressed as LiMeO_2 (Me is at least one or more transition metals), and the following may be given as specific examples: LiCoO_2, LiNiO_2, $\text{LiNi}_{1-x}\text{Co}_x\text{O}_2$, $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$, $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Mn}_{0.4}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Ti}_{0.4}\text{O}_2$, LiMnO_2.”). Ishigaki, ¶ [0027] (“<Lithium Transition Metal Compound> In the present invention, a ‘lithium transition metal compound’ is a compound having a structure capable of removing and inserting a Li ion, and examples thereof include sulfides, phosphate compounds, lithium transition metal complex oxides, and the like. Examples of sulfides include compounds with two-dimensional layered structures such as TiS_2 and MoS_2, and Chevrel compounds with strong three-dimensional framework structures expressed by the general formula $\text{Me}_x\text{Mo}_6\text{S}_8$ (Me is any transition metal including Pb, Ag, and Cu). Examples of phosphate compounds include those that belong to an olivine structure, which are generally expressed as LiMePO_4 (Me being at least one or more transition metals), and specific examples include LiFePO_4, LiCoPO_4, LiNiPO_4, LiMnPO_4 and the like. Examples of lithium transition metal complex oxides include those having a spinel structure that allows for three-dimensional diffusion, and those having a layered structure that allows for two-dimensional diffusion of lithium ions. Those having a spinel structure are generally expressed as LiMe_2O_4 (Me is at least one or more transition metals), and specific examples include LiMn_2O_4, LiCoMnO_4, $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$, CoLiVO_4, and the like. Those that have a layered structure are generally expressed as LiMeO_2 (Me is at least one or more transition metals), and the following may be given as specific examples: LiCoO_2, LiNiO_2, $\text{LiNi}_{1-x}\text{Co}_x\text{O}_2$, $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$, $\text{LiNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Mn}_{0.4}\text{O}_2$, $\text{Li}_{1.2}\text{Cr}_{0.4}\text{Ti}_{0.4}\text{O}_2$, LiMnO_2.”).

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Claim	Corresponding Prior Art Disclosures
10[pre]: An electrochemical device, comprising	The ATL 265066 Cell/Electrode comprises “[a]n electrochemical device, comprising” For example, the ATL 265066 Cell/Electrode comprises an electrochemical device, such as a battery. <i>See, e.g.,</i>:  COSMXATLTX-00048249.

Claim	Corresponding Prior Art Disclosures
	Figure 3. (a) front side (display side) of the battery seen while still in the iPod touch, (b) back side of the battery removed from the device COSMXATLTX-00048250. Ishigaki also discloses “[a]n electrochemical device, comprising” For example, Ishigaki discloses an electrochemical device, such as a battery. <i>See, e.g.,</i>: Ishigaki, [Title of Invention] “POSITIVE ELECTRODE FOR LITHIUM RECHARGEABLE BATTERY AND LITHIUM RECHARGEABLE BATTERY USING SUCH.” Ishigaki, [Abstract] (“[Problem]To provide a positive electrode for lithium rechargeable batteries that ensures a high level of safety against internal short circuits in the battery and has excellent battery characteristics such as high output and high capacity, and a lithium rechargeable battery that uses the positive electrode for lithium rechargeable batteries.”).

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Claim	Corresponding Prior Art Disclosures
	Ishigaki, [Claims 10 and 11] (“[Claim 10] A lithium rechargeable battery using the positive electrode for lithium rechargeable batteries according to any one of claims 1 through 9. [Claim 11] The lithium rechargeable battery according to claim 10, wherein a capacitance when performing a constant current discharge test with a 5-hour-rate current is 500 mAh or greater.”). Ishigaki, ¶ [0001] (“The present invention relates to a positive electrode for lithium rechargeable batteries used in lithium rechargeable batteries and the like, and to a lithium rechargeable battery using the positive electrode for lithium rechargeable batteries.”). Ishigaki, ¶ [0013] (“Furthermore, in order to overcome the above problems, the present invention has an object to provide a positive electrode for lithium rechargeable batteries that ensures a high level of safety against internal short circuits in the battery and has excellent battery characteristics such as high output and high capacity, and a lithium rechargeable battery that uses the positive electrode for lithium rechargeable batteries.”). Ishigaki, ¶ [0014] (“(10) A lithium rechargeable battery using the positive electrode for lithium rechargeable batteries according to any one of (1) through (9). (11) The lithium rechargeable battery according to (10), characterized in that a capacitance when performing a constant current discharge test with a 5-hour-rate current is 500 mAh or greater.”). Ishigaki, ¶ [0018] (“[Lithium Rechargeable Battery] The lithium rechargeable battery in the present invention is, for example, a small lithium rechargeable battery used mainly in electronic devices and the like, or a lithium rechargeable battery for automobiles, which has recently been the subject of vigorous research. ... By taking the above configuration, the positive electrode of the present invention provides a positive electrode and thus a lithium rechargeable battery having high performance characteristics, particularly high capacity and high safety, when used in a battery.”). Ishigaki, ¶¶ [0110]-[0111] (“[Conductive Material] The positive electrode active material layer of the present invention is characterized in that it contains a conductive material to increase electrical conductivity. There are no particular limitations on the type, but specific examples include metal materials such as copper and nickel, graphite (graphite) such as natural graphite and artificial graphite, carbon black such as acetylene

Claim	Corresponding Prior Art Disclosures
	black, and carbon materials such as amorphous carbon such as needle coke. Note that these substances may be used alone or in any combination of two or more in any ratio. The ratio of the conductive material in the positive electrode active material layer is normally 1 mass% or more, preferably 2 mass% or more, and more preferably 3 mass% or more, and is normally 15 mass% or less, preferably 10 mass% or less, and more preferably 8 mass% or less. If the ratio of the conductive material is too low, the conductivity may be insufficient, whereas if it is too high, the battery capacity may decrease. Furthermore, in the present invention, the conductive material is preferably carbon black having a nitrogen adsorption specific surface area (N2SA) of 80 m²/g or more. Here, with conventionally known carbonaceous materials as conductive materials, including carbon black, the amount of dehydrogenation increases when an attempt is made to increase the nitrogen adsorption specific surface area, and conversely, when an attempt is made to keep the amount of dehydrogenation low, the specific surface area decreases, and the amount of 24M4DBP absorption also decreases, making it difficult to increase the electrical conductivity of the conductive material itself while also improving lifespan. However, since carbon black having a specific 24M4DBP absorption is used, it is preferable to adjust the production conditions of the carbon black and adjust the nitrogen adsorption specific surface area and 24M4DBP absorption within a specific range, thereby increasing the electrical conductivity to accommodate high output and achieving a positive electrode having an improved electrochemical lifespan, and thus a lithium rechargeable battery having a high output and long lifespan.”); <i>see also</i> Ishigaki, ¶¶ [0116]-[0137]. Ishigaki, ¶¶ [0224]-[0225] ([Lithium Rechargeable Battery] Next, the lithium rechargeable battery of the present invention will be described. The lithium rechargeable battery is provided with a positive electrode, a negative electrode, and a non-aqueous electrolyte containing a lithium salt as an electrolytic salt, wherein the positive electrode is the positive electrode for lithium rechargeable batteries of the present invention described above. The lithium rechargeable battery of the present invention may further include a separator for holding a non-aqueous electrolyte between the positive electrode and the negative electrode. In order to effectively prevent a short circuit due to contact between the positive electrode and the negative electrode, it is desirable to interpose a separator in this manner. The positive electrode for lithium rechargeable batteries of the present invention is normally produced by assembling, in an appropriate shape, the positive electrode and/or negative electrode for lithium rechargeable batteries of the present invention described above, an electrolyte, and a separator that is used as needed. Furthermore, other constituent elements such as an outer case may be used as necessary.”); <i>see also</i> Ishigaki, ¶¶ [0226]-[0339] (describing assembly of battery).

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Claim	Corresponding Prior Art Disclosures
10[a]: an electrode, wherein the electrode comprises:	See Claim 1[pre].
10[b]: a current collector	See Claim 1[a].
10[c]: a first layer comprising a first material; and	See Claim 1[b].
10[d]: a second layer comprising a second material;	See Claim 1[c].
10[e]: wherein the first layer is arranged between the current collector and the second layer,	See Claim 1[d].
10[f]: the first layer is formed on a surface of the current collector, and	See Claim 1[e].
10[g]: a particle size of 90% accumulative volume of the first material is less than 40 μm ;	See Claim 1[f].
10[h]: wherein a total compaction density of the first layer and the second	See Claim 1[g].

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Claim	Corresponding Prior Art Disclosures
layer is greater than 3.2 g/cc.	
11: The ~~electrochemical device according to claim 10, wherein a thickness of the first layer is not less than the particle size of 90% accumulative volume of the first material in the first layer.~~	See Claim 2.
12: The electrochemical device according to claim 10, wherein a ratio of the average particle size of the second material to the average particle size of the first material is from 1:1 to 40:1.	See Claim 3.
13: The electrochemical device according to claim 10, wherein the first material has an average particle size in a range of 0.2 μm to 15 μm .	See Claim 4.

Claim	Corresponding Prior Art Disclosures
15: The electrochemical device according to claim 10, wherein the first layer has a lower compaction density than the second layer.	See Claim 6.
16: The electrochemical device according to claim 10, wherein the first material comprises one selected from the group consisting of lithium cobaltate, lithium manganate, lithium nickelate, lithium nickel cobalt manganese oxide, lithium iron phosphate, lithium iron manganese phosphate, lithium vanadium phosphate, lithium vanadyl phosphate, lithium-rich manganese-based materials, lithium nickel cobalt	See Claim 7.

Claim	Corresponding Prior Art Disclosures
aluminate and lithium titanate, and combinations thereof.	
17: The electrochemical device according to claim 10, wherein the second material comprises one selected from the group consisting of lithium cobaltate, lithium nickel cobalt manganese oxide, lithium nickel cobalt aluminum oxide, lithium-rich manganese-based material, lithium iron phosphate, and combinations thereof.	See Claim 8.
19[pre]: An electronic device, comprising	The ATL 265066 Cell/Electrode necessarily and inherently comprises “[a]n electronic device, comprising:” For example, the ATL 265066 Cell/Electrode was used in consumer electronics devices, such as the iPod touch 6. COSMXATLTX-00048243-00048271. Ishigaki also discloses “[a]n electronic device, comprising:” For example, Ishigaki discloses an electronic device, such as portable devices such as notebook computers, mobile phones, and handheld video cameras, as well as hybrid electric vehicles, laptop computers, pen-input

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Claim	Corresponding Prior Art Disclosures
	computers, mobile computers, electronic book players, mobile phones, portable fax machines, portable copiers, portable printers, headphone stereos, video movie machines, liquid crystal televisions, handheld cleaners, portable CDs, mini discs, walkie-talkies, electronic organizers, calculators, memory cards, portable tape recorders, radios, backup power sources, motors, lighting equipment, toys, game equipment, clocks, strobes, cameras, pacemakers, electric tools, automotive power sources, orbital vehicle power sources, and satellite power sources. <i>See, e.g.,</i>: Ishigaki, ¶ [0004] (“A lithium rechargeable battery will be described below as an example, but the type of the lithium rechargeable battery of the present invention is not limited as long as the effect of the conductive material is not impaired. Among lithium rechargeable batteries, rechargeable batteries known as lithium rechargeable batteries or lithium ion rechargeable batteries have excellent energy density and power density, and may be made smaller and lighter, and are therefore used as power sources for portable devices such as notebook computers, mobile phones, and handheld video cameras, as well as hybrid electric vehicles, and research into improving their performance is thriving.”). Ishigaki, ¶ [0384] (“[Industrial Applicability] The applications of the lithium rechargeable battery using the lithium transition metal composite oxide powder of the present invention are not particularly limited, and the battery may be used for various known applications. Specific examples include laptop computers, pen-input computers, mobile computers, electronic book players, mobile phones, portable fax machines, portable copiers, portable printers, headphone stereos, video movie machines, liquid crystal televisions, handheld cleaners, portable CDs, mini discs, walkie-talkies, electronic organizers, calculators, memory cards, portable tape recorders, radios, backup power sources, motors, lighting equipment, toys, game equipment, clocks, strobes, cameras, pacemakers, electric tools, automotive power sources, orbital vehicle power sources, and satellite power sources.”).
19[a]: an electrochemical device, the electrochemical device comprising	<i>See</i> Claim 10[pre].
19[b]: an electrode, wherein the	<i>See</i> Claim 1[pre].

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Claim	Corresponding Prior Art Disclosures
electrode comprises	
19[c]: a current collector;	See Claim 1[a].
19[d]: a first layer comprising a first material; and	See Claim 1[b].
19[e]: a second layer comprising a second material;	See Claim 1[c].
19[f]: wherein the first layer is arranged between the current collector and the second layer,	See Claim 1[d].
19[g]: the first layer is formed on a surface of the current collector, and	See Claim 1[e].
19[h]: a particle size of 90% accumulative volume of the first material is less than 40 μm ;	See Claim 1[f].
19[i]: wherein a total compaction density of the first layer and the second layer is greater than 3.2 g/cc.	See Claim 1[g].
20. The electronic	See Claim 6.

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Claim	Corresponding Prior Art Disclosures
device according to claim 19, wherein the first layer has a lower compaction density than the second layer.	

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