

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMPEREX TECHNOLOGY LIMITED,
Petitioner,

v.

SEMICONDUCTOR ENERGY LABORATORY CO., LTD.
Patent Owner.

U.S. Patent No. 11,043,660

Case IPR2023-01349

**DECLARATION OF JENNIFER A. BABBITT
PURSUANT TO 37 C.F.R. 42.65(b)(2)**

I, Jennifer A. Babbitt, hereby declare under penalty of perjury as follows:

I. INTRODUCTION

1. I am an Electronic Services Librarian at Kirkland & Ellis LLP. I am making this declaration of my own personal knowledge.

2. I make this declaration in support of Petitioner's Petition for *Inter Partes* Review ("IPR") of U.S. Patent No. 11,043,660 ("the '660 Patent"). I make this declaration of my own personal knowledge.

II. QUALIFICATIONS

3. I obtained a master's degree in Library and Information Science from San Jose State University in 2013. In connection with that degree, my coursework focused on library operation and catalog management.

4. From 2012 to 2014, I worked as an Archive Consultant at the Golden Gate National Recreation Area. I assisted in the archival of Golden Gate National Recreation Area's documents and the maintenance of active division records. I also created finding aids for discrete collections and worked in preserving and arranging active records for multiple divisions within the Golden Gate National Recreation Area, including the superintendent's office.

5. From 2014 to present, I have been working as a Research Assistant at Kirkland & Ellis LLP. My primary responsibilities include the following:
(1) maintaining the library catalog, including by coordinating the cataloging of new

material and routing of serial publications; (2) working with outside vendors to maintain/update standing orders and facilitate new orders; (3) coordinating interlibrary loans; (4) cataloging and maintaining technical book collections; and (5) assisting with research and document retrieval.

6. Through my education and experience described above, I have interacted with and have become personally familiar with the Education Resources Information Center (ERIC) and its collection of education resources. I understand that ERIC is an online library of education resources maintained by the Institute of Education Sciences, which is a branch of the U.S. Department of Education. I have used and am familiar with ERIC, including by performing searches on its online database to find information about the availability of educational articles and other references, and by downloading these articles and references.

7. Through my education and experience described above, I have also interacted with and have become personally familiar with Semantic Scholar. I understand that Semantic Scholar is an online search engine for scholarly articles that aims to use artificial intelligence to provide summaries of scholarly articles across a variety of scientific disciplines. I have used and am familiar with Semantic Scholar, including by performing searches through its search engine to find information about the availability of scholarly articles, and by downloading these articles.

III. EXHIBITS TO THE PETITION

8. Exhibit 1007 is a true and correct copy of Stabilization of the Electronic Structure at the Cathode/Electrolyte Interface via MgO Ultra-thin Layer During Lithium-ions Insertion/Extraction, 82 Electrochemistry, 891–896 (2014), authored by Yamamoto et al. I obtained this record from https://www.jstage.jst.go.jp/article/electrochemistry/82/10/82_14-E00036/_article/-char/ja/ on July 26, 2023. In that record, the publication date of Yamamoto et al., is October 2014.

9. Exhibit 1009 is a true and correct copy of *A New Coating Method for Alleviating Surface Degradation of $\text{LiNi}_{0.6}\text{Co}_{0.2}\text{MnO}_2$ Cathode Material: Nanoscale Surface Treatment of Primary Particles*, 15 Nano Lett., 2111–2119 (2015), authored by Kim et al. I obtained this record from <https://pubs.acs.org/doi/10.1021/acs.nanolett.5b00045> on June 27, 2023. In that record, the publication date of Kim et al., is February 2015.

10. Exhibit 1010 is a true and correct copy of *Effects of MgO Coating on the Structural and Electrochemical Characteristics of LiCoO_2 as Cathode Materials for Lithium Ion Battery*, 26 Chem. Mater. 2537–43 (2014), authored by Jae-Hyun Shim, Sangham Lee, and Sung-Soo Park. I obtained this record from <https://pubs.acs.org/doi/10.1021/cm403846a> on June 23, 2023. In that record, the publication date of Shim et al., is March 2014.

11. Exhibit 1011 is a true and correct copy of *The Investigation of Ti-Modified LiCoO₂ Materials for Lithium Ion Battery*, 262 Journal of Power Sources, 136–139 (2014), authored by Yu, et al. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S0378775314003966> on May 5, 2023. In that record, the publication date of Yu is September 2014.

12. Exhibit 1012 is a true and correct copy of *Interface Characterization of MgF₂-Coated LiCoO₂ Thin Films*, 230 Solid State Ionics, 86–91 (2013), authored by Hye Jin Lee & Yong Joon Park. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S0167273812004602> on May 5, 2023. In that record, the publication date of Lee & Park is January 2013.

13. Exhibit 1013 is a true and correct copy of Ashcroft & Mermin, Solid State Physics, Cengage Learning, 1st ed. (1976). I purchased this book from https://www.amazon.com/dp/0030839939?psc=1&ref=ppx_yo2ov_dt_b_product_details on July 27, 2023. In that record, the publication date is January 1976.

14. Exhibit 1018 is a true and correct copy of *Surface Film Formation on Electrodes in a LiCoO₂/Graphite Cell: A Step by Step XPS Study*, 174 Journal of Power Sources, 462–68 (2007), authored by Dedryvère et al. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S0378775307012864> on May 5, 2023. In that record, the publication date of Dedryvère et al., is December 2007.

15. Exhibit 1019 is a true and correct copy of *Development of Artificial Surface Layers for Thin Film Cathode Materials*, Material Chemistry, Université de Bordeaux; Technische Universität (Darmstadt, Allemagne) (2015) English, authored by Mercedes Alicia Carrillo Solano. I obtained this record from <https://theses.hal.science/tel-01327672/> on May 5, 2023. In that record, the publication date of Solano is October 2015.

16. Exhibit 1020 is a true and correct copy of *On the Capacity Fading of LiCoO₂ Intercalation Electrodes: The Effect of Cycling, Storage, Temperature, and Surface Film Forming Additives*, 47 *Electrochimica Acta*, 4291–306 (2002), authored by Aurbach et al. I obtained this record from <https://www.sciencedirect.com/science/article/pii/S0013468602004176?via%3Dihub> on June 2, 2023. In that record, the publication date of Aurbach et al., is October 2002.

17. Exhibit 1021 is a true and correct copy of *Thermodynamic Aspects of Cathode Coatings for Lithium-Ion Batteries*, *Advanced Energy Materials*, 1400690 (2014), authored by Aykol et al. I obtained this record from <https://onlinelibrary.wiley.com/doi/abs/10.1002/aenm.201400690> on May 5, 2023. In that record, the publication date of Aykol et al., is August 2014.

18. Exhibit 1022 is a true and correct copy of *Application of Fluorine-containing Solvents in High Voltage Operation*, 78 *Electrochemistry*, 345-348

(2010), authored by Kitagawa et al. I obtained this record from https://www.jstage.jst.go.jp/article/electrochemistry/78/5/78_5_345/_article on May 5, 2023. In that record, the publication date of Kitagawa et al., is May 2010.

19. Exhibit 1023 is a true and correct copy of *Role of AlF_3 Coating on $LiCoO_2$ Particles during Cycling to Cutoff Voltage above 4.5 V*, 156 Journal of the Electrochemical Society, A1005–A1010 (2009), authored by Sun et al. I obtained this record from <https://iopscience.iop.org/article/10.1149/1.3236501/meta> on May 5, 2023. In that record, the publication date of Sun is October 2009. The article was purchased through the document delivery partner CCC RightFind at <https://www.rightfind.com/vlib/order/OpenURLReceive.aspx?action=order&doi=10.1149/1.3236501>.

20. Exhibit 1024 is a true and correct copy of *High Voltage Stability and Enhanced Electrochemical Performances of $LiCoO_2$ by CeF_3 Coating*, IEEE (2015), authored by Aboulaich et al. I obtained this record from <https://ieeexplore.ieee.org/abstract/document/7454976> on May 5, 2023. In that record, the publication date of Aboulaich et al. is December 2015.

21. Exhibit 1025 is a true and correct copy of *Structure and surface morphology of $LiCoO_2$ thin film cathodes prepared by pulsed laser deposition*, (2012), authored by M.C. Rao. I obtained this record from

https://chalcogen.ro/35_Rao.pdf on July 10, 2023. In that record, the publication date of Rao, is August 2012.

22. Exhibit 1026 is a true and correct copy of *Probing the Origin of Enhanced Stability of “AlPO₄” Nanoparticle Coated LiCoO₂ During Cycling to High Voltages: Combined XRD and XPS Studies*, 21 Chem. Mater., 4408–4424 (2009), authored by Lu et. al. I obtained this record from <https://pubs.acs.org/doi/abs/10.1021/cm900862v> on July 26, 2023. In that record, the publication date of Lu et al., is September 2009.

23. Exhibit 1029 is a true and correct copy of *Infiltrative Coating of LiNi_{0.5}Co_{0.2}Mn_{0.3}O₂ Microspheres with Layer-Structured LiTiO₂: Toward Superior Cycling Performances for Li-ion Batteries*, J. Mater. Chem. A (2012), authored by Wang et. al. I obtained this record from <https://pubs.rsc.org/en/content/articlelanding/2014/ta/c4ta04196h/unauth> on July 26, 2023. In that record, the publication date of Wang et al., is September 2014.

24. Exhibit 1030 is a true and correct copy of *Lithium Transport Through Lithium-ion Battery Cathode Coatings*, 3 J. Mater. Chem. A, 17248–17272 (2015), authored by Xu et. al. I obtained this record from <https://pubs.rsc.org/en/content/articlehtml/2015/ta/c5ta01664a> on July 26, 2023. In that record, the publication date of Xu et al., is July 2015.

25. Exhibit 1031 is a true and correct copy of *Performance Improvement of LiCoO₂ by Molten Salt Surface Modification*, 167 J. Power Sources, 504–509 (2007), authored by Bai et. al. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S0378775307003692> on July 26, 2023. In that record, the publication date of Bai et al., is May 2007.

26. Exhibit 1032 is a true and correct copy of *Synergistic effects of coating and doping for lithium ion battery cathode materials: synthesis and characterization of lithium titanate-coated LiCoO₂ with Mg doping*, Electrochimica Acta 186 (2015) 201–208, authored by Shim et. al. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S0013468615307180> on March 17, 2023. In that record, the publication date of Shim et al., is December 2015.

27. Exhibit 1033 is a true and correct copy of *A New Cathode Material for Batteries of High Energy Density* (1980) 783-789, authored by K. Mizushima. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/0025540880900124> on August 8, 2023. In that record, the publication date of Mizushima is June 1980.

28. Exhibit 1034 is a true and correct copy of *Hybrid Microwave Synthesis and Characterization of the Compounds in the Li-Ti-O system* (2008) 575–580, authored by Yang et al. I obtained this record from

<https://www.sciencedirect.com/science/article/abs/pii/S037877530701779X> on

August 8, 2023. In that record, the publication date of Yang et al., is January 2008.

29. Exhibit 1035 is a true and correct copy of *Lithium Titanate Epitaxial Coating on Spinel Lithium Manganese Oxide Surface for Improving the Performance of Lithium Storage Capability* (2014), authored by Li et al. I obtained this record from <https://pubs.acs.org/doi/abs/10.1021/am504319y> on August 8, 2023. In that record, the publication date of Li et al., is October 2014.

30. Exhibit 1036 is a true and correct copy of *M₃ (PO₄)₂-Nanoparticle-Coated LiCoO₂ vs LiCo_{0.96}M_{0.04}O₂ (M = Mg and Zn) on Electrochemical and Storage Characteristics*, authored by Eom et al. I obtained this record from <https://iopscience.iop.org/article/10.1149/1.2827993/meta> on August 8, 2023. In that record, the publication date of Eom et al., is January 2008.

31. Exhibit 1037 is a true and correct copy of *Phase equilibria in the Li/Ti/O system and physical properties of Li₂TiO₃* (2002) 361-366, authored by H. Kleykamp. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S0920379602001205> on August 8, 2023. In that record, the publication date of Kleyamp is November 2002.

32. Exhibit 1038 is a true and correct copy of *Performance Improvement of LiCoO₂ by MgF₂ Surface Modification and Mechanism Exploration*, 134 *Electrochimica Acta*, 347–354 (2014), authored by Bai et. al. I obtained this record

from <https://www.sciencedirect.com/science/article/abs/pii/S0013468614009359> on August 11, 2023. In that record, the publication date of Bai et al., is July 2014.

33. Exhibit 1039 is a true and correct copy of *Epitaxial Growth of (104)- and (018)-Oriented LiCoO₂ films on MgO Single Crystals Prepared by Chemical Vapor Deposition* (2013), authored by Katsui et al. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S025789721201273X> on June 21, 2023. In that record, the publication date of Katsui et al., is March 2013.

34. Exhibit 1040 is a true and correct copy of *On the synthesis and optical absorption studies of nano-sized magnesium oxide powder*. *Journal of Physics and Chemistry of Solids*, 69(11), pp.2764-2722 (2008), authored by Kumar et al. I obtained this record from <https://www.sciencedirect.com/science/article/abs/pii/S002236970800348X> on August 22, 2023. In that record, the publication date of Kumar et al., is November 2008.

IV. CONCLUSION

35. I declare under penalty of perjury under the laws of the United States of America that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and

the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code.

Date: August 29, 2023

Respectfully submitted,

Jennifer Babbitt

Jennifer A. Babbitt