

EXHIBIT 048-H

***Inpria Corporation v. Lam Research Corp.*, Case No. 1-22-cv-01359-CJB
Exhibit 048-H - Invalidity Claim Chart for U.S. Patent No. 11,537,048**

U.S. Patent Publication No. 2017/0102612 (“Meyers ’612”) published on **April 13, 2017**. Meyers ’612 is therefore prior art to the ’048 under AIA 35 U.S.C. 102(a)(1).¹

U.S. Patent No. 8,536,068 (“Weidman ’068”) issued from an application that published on **April 12, 2012** as U.S. Publication No. 2012/0088369 (“Weidman Publication”). The Weidman Publication is prior art to the ’048 Patent under AIA 35 U.S.C. 102(a)(1). Citations below to Weidman ’068 are equally found in the Weidman Publication. Accordingly, any citation to Weidman ’068 below incorporates by reference the equivalent or similar citation found in the Weidman Publication and vice versa. See also US Publication Number 2012/0088193, which published with equivalent disclosures on April 12, 2012.

U.S. Patent Publication No. 2011/0183527 (“Cho ’527”) **published on July 28, 2011**. Cho is therefore prior art to the ’048 Patent under AIA 35 U.S.C. 102(a)(1).

Cardineau, Brian, “Novel Resist Systems for EUV Lithography: LER, Nanoparticle, Chain-Scission and MORE” (Ph.D. Dissertation, State University of New York) (“Cardineau Dissertation”) published in **2013**. Cardineau Dissertation is therefore prior art to the ’048 Patent under AIA 35 U.S.C. 102(a)(1).

Cardineau, Brian, et al. “Photolithographic properties of tin-oxo clusters using extreme ultraviolet light (13.5 nm).” *Microelectronic engineering* 127 (2014): 44-50 (“Cardineau Paper”) published on **April 24, 2014**. The Cardineau Paper is therefore prior art to the ’048 under AIA 35 U.S.C. 102(a)(1).

Cardineau, Brian, “Molecular Organometallic Resists for EUV (MORE), EUV Symposium TWG, Toyama Japan” (“Cardineau Symposium Presentation”) published on **October 6, 2013**. Cardineau Symposium Presentation is therefore prior art to the ’048 Patent under AIA 35 U.S.C. 102(a)(1). None of the exceptions under 35 U.S.C. §102(b)(1) apply because “Cardineau Symposium Presentation” was published over one year before the purported earliest priority date (October 13, 2015) that the ’048 patent claims.

Meyers ’612 renders Asserted Claims 1-10, 14-20 of the ’048 Patent obvious alone, in combination with the Weidman ’068 Cardineau Dissertation, Cardineau Symposium Presentation, Cho ’527, and in combination with the general knowledge of a person of ordinary

¹ Meyers ’612 is available as prior art under 35 U.S.C. 102(a)(1) because the earliest priority date of challenged claims 1-10, 14-20 of the ’048 Patent is January 21, 2021, which is the first date that the first version of Figure 16 and related text were added to the specification.

skill in the art, and/or in combination with the other references identified in Defendant's Invalidity Contentions, including as set forth in this chart.

With respect to the obviousness of the asserted claims under 35 U.S.C. § 103, one or more of the principles enumerated by the United States Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007) apply, including: (a) combining various claimed elements known in the prior art according to known methods to yield a predictable result; (b) making a simple substitution of one or more known elements for another to obtain a predictable result; (c) using a known technique to improve a similar device or method in the same way; (d) applying a known technique to a known device or method ready for improvement to yield a predictable result; (e) choosing from a finite number of identified, predictable solutions with a reasonable expectation of success or, in other words, the solution was one which was "obvious to try"; (f) a known work in one field of endeavor prompting variations of it for use either in the same field or a different field based on given design incentives or other market forces in which the variations were predictable to one of ordinary skill in the art; and/or (g) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine the teachings of various prior art references to arrive at the claimed invention. It would have been obvious to a person of ordinary skill in the art to combine Meyers '612 with the general knowledge of a person of ordinary skill in the art, and/or one or more of the references identified in Defendant's Invalidity Contentions in accordance with the principles and rationales set forth above.

Beyond the specific motivations identified in the cited references, motivation to modify and combine particular references comes from: (a) the nature of the problem being solved; (b) the teachings of the prior art; (c) the knowledge of persons of ordinary skill in the art; (d) the fact that the references address the same or similar technical issues as the '048 patent; and (e) considerations of efficiency, effectiveness, convenience, cost-savings, and accessibility to combine the various teachings.

This claim chart is meant to illustrate one example of how the asserted claims are invalid for obviousness. By not discussing portions of a reference in the claim chart below, Defendant does not waive its right to rely on these portions of the reference. Instead, Defendant expressly reserves the right to rely on any and all portions of the cited references. These contentions are not an admission by Defendant that any accused materials are covered by or infringe the asserted claims of the '048 patent, particularly after the claims are construed by the Court. These contentions are not an admission by Defendant as to the proper scope of any asserted claim, the proper construction of any term in any asserted claim, or whether particular elements may be construed at all, or instead, are indefinite. Defendant reserves the right to modify, amend, or supplement these contentions as additional information becomes available during the course of this action and in view of any applicable claim construction order from the Court.

'048 Patent Claims	Disclosure of Prior Art
Claim 1	
[1p] A system comprising: a deposition chamber having an interior isolated from the ambient atmosphere	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. A POSA would understand that the deposition chamber is part of a system for performing vapor deposition methods. <i>See, e.g.</i>, Meyers '612 at ¶ 0033. Meyers '612 discloses a “method for forming a radiation patternable coating comprising a metal oxo-hydroxo network with metal cations having organic ligands with metal carbon bonds and metal oxygen bonds, the method comprising inputting into a deposition chamber....” Meyers '612, ¶¶ 0009, 0143-0144. Meyers '618 notes that “[c]ommercial CVD apparatuses can be adapted for this use or specific equipment can be used.” Meyers '612, ¶ 0079. Weidman '068's “apparatus for deposition of a film on a substrate” has “a deposition chamber for atomic layer deposition of a film on a substrate” and “a chamber configured to operate in both an ALD mode as well as a conventional CVD mode....” Weidman '068, 8:43-45; 9:12-15. Weidman '068 notes: “the apparatus comprises a deposition chamber for atomic layer deposition of a film on a substrate. The chamber comprises a process area for supporting a substrate. The apparatus includes a first precursor inlet in fluid communication with a supply of a first precursor containing substituents with cross-linkable moieties...[and] a reactant gas inlet in fluid communication with a supply of a reactant gas selected from ozone, H₂O, H₂O₂, NH₃, reactive oxygen, reactive nitrogen, and reactive hydrogen. <i>Id.</i>, 8:48-52.

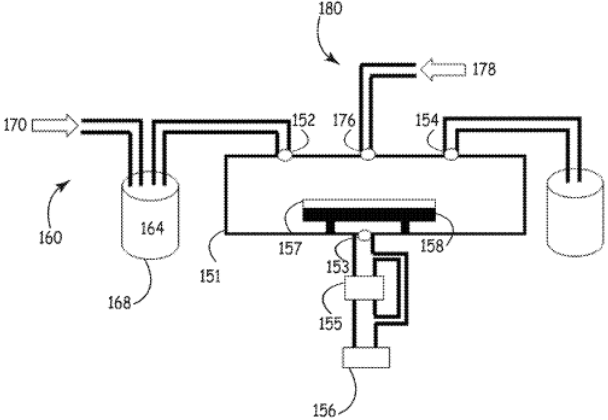
'048 Patent Claims	Disclosure of Prior Art
	Meyers '612's "deposition chamber [is] closed from the ambient atmosphere." Meyers '612, ¶¶ 0009, 0143-0144. The pressure and temperature in the chamber can be selected, indicating that the deposition chamber is isolated from the ambient atmosphere. <i>Id.</i> [0078]; '048 Patent, 34:49-51. Additionally, Weidman '068's apparatus has a deposition chamber that may be "pressurized" (e.g., "at a pressure within a range from about 0.1 Torr to about 10 Torr") and/or heated (e.g., "such as within a range from about 50° C to about 400° C"), indicating that the chamber is "isolated from the ambient atmosphere."
[1a] a substrate within the interior of the deposition chamber configured to receive a deposition on a surface of the substrate,	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 discloses that "a substrate can be configured with a surface to receive the hydrolyzed or oxidized composition." Meyers '612, ¶ 0009; <i>see also id.</i> ¶ 0078 ("In CVD methods, two or more reactant gases are generally mixed in the chamber in the vicinity of the substrate surface."). Meyers '612 notes that "any suitable solution coating process can be used to deliver the precursor solution to a substrate in addition to the vapor deposition processes." <i>Id.</i> ¶ 0070. A POSA would understand the substrate is within the deposition chamber's interior to receive the deposition. '048 Patent, Claim 1; <i>id.</i>, 5:50-6:15 ("in situ hydrolysis process" (i.e., in the chamber")); '048 Patent, 18:51-53 ("In CVD methods, two or more reactant gases are generally mixed in the chamber in the vicinity of the substrate surface."). Weidman '068 also discloses "a deposition chamber for atomic layer deposition of a film on a substrate." Weidman '068, 8:43-45; '048 Patent, Claim 1.
[1b] wherein the substrate is maintained at a temperature of less than 200° C.;	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches maintaining a substrate at a temperature from about 40 °C to about 175 °C, and from about 50 °C to about 160 °C, both ranges are temperatures of less than 200° C, and notes

'048 Patent Claims	Disclosure of Prior Art
	that a POSA would recognize that “additional ranges of pressure and temperature within the explicit ranges above are contemplated and re [sic, “are”] within the present disclosure.” Meyers ’612, ¶ 0082. Additionally, Weidman ’068’s “chamber or substrate may be heated to a temperature of ... less than about 200° C ... or less than about 100°.” Weidman ’068, 9:21-26. Additionally, a POSA would be motivated to maintain the substrate at less than 200 °C because, as Meyers ’612 explains, reaction temperatures below about 200 °C limit de-alkylation and/or prevent excessive dehydration and condensation of an oxide hydroxide. Meyers ’612, ¶ 0082; ’048 Patent, claim 1.
[1c] an inlet into the deposition chamber;	Meyers ’612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers ’612 teaches a secondary reactant can enter the deposition chamber through an inlet into the chamber. Meyers ’618, 18:64-66. Meyers ’612 describes how “[t]he secondary reactant to drive hydrolysis/oxidation can be introduced through a separate inlet into the chamber.” <i>Id.</i>, 18:44-19:6. Additionally, Weidman ’068’s apparatus can include one or more inlets into the deposition chamber. Weidman ’068, 8:47-61 (“a first precursor inlet,” “a reactant gas inlet,” “a purge gas inlet,” and “an auxiliary gas inlet”).
[1d] structure configured to deliver flow from a supply of an inert gas;	Meyers ’612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. A POSA would be motivated to use Weidman ’068’s gas channels to couple an inert gas supply through the precursor ampoule to the inlet to the deposition chamber to deliver Meyer’s precursors because Meyers ’612 teaches that inert gases (e.g., Nitrogen and Argon) can be used as carrier gases in ALD (sequential) and CVD (continuous) systems. Meyers ’612, ¶ 0079.

'048 Patent Claims	Disclosure of Prior Art
	The structure as tied to Figure 16 of the '048 Patent is a conduit to deliver from a supply of inert gas, e.g., connecting “vessel 168” to “supply of inert gas 170,” and equivalents thereof or, if not tied to Figure 16, a conduit (like a pipe) a supply of inert gas, e.g., connecting an interconnected vessel (like a vaporization chamber) to a supply of inert gas, and equivalents thereof. As set forth in the parties' claim construction filings, the parties have disputed the meaning of this limitation. The structure disclosed in Weidman '068 reference, as identified above, meets this limitation under both parties' proposed constructions. Although Meyers '612 discloses a CVD machine, it does not explicitly disclose a conduit (e.g., pipe) connecting a vessel to a supply of inert gas or equivalents thereof. Weidman '068's apparatus for performing vapor deposition includes one or more inlets into the deposition chamber, Weidman '068, 8:47-61, and “the various gases for the process may be pulsed into an inlet through a gas channel, from various holes or outlets, and into a central channel.” <i>Id.</i>, 8:16-20. In Weidman '068, “[e]ach inlet may be controlled by an appropriate flow controller such as a mass flow controller or volume flow controller in communication with a central processing unit (CPU) that allows flow of each of the reactants to the substrate to perform a[n] ALD process.” <i>Id.</i>, 7:53-56. Weidman '068's “processing chamber would include separate supplies of the A, B, and C reactants, along with a supply of carrier, purge and inert gases such as argon and nitrogen in fluid communication with gas inlets for each of the reactants and gases” and that “[t]he substrate...can be exposed to a metal-containing “A” precursor gas or vapor formed by passing a carrier gas (for example, nitrogen or argon) through an ampoule of the precursor...can be delivered at any suitable flow rate...” Weidman '068, 11:66-12:6. Thus, Weidman '068 discloses conduits like gas channels, outlets, central channels and conduits through flow controllers to supply an inert carrier gas to a vessel, e.g., from the source of the precursor. Thus, Meyers '612 + Weidman '068 discloses the claimed “structure [e.g., Weidman '068's gas channels] configured to deliver flow from a supply of an inert gas.”
[1e] a supply of an organotin composition comprising a compound described by the formula RSnX_3 , where R is an organic	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation.

'048 Patent Claims	Disclosure of Prior Art
ligand with 1-31 carbon atoms and is bound to Sn with a metal-carbon bond and	Meyers '612 teaches inputting into a deposition chamber a first precursor vapor including a compound having the formula R_nSnX_{4-n} where $n=1$ in which R is a hydrocarbyl group with 1-31 carbon atoms (hydrocarbyl is an organic ligand bound to tin with a metal-carbon bond). Meyers '612, ¶¶ 0009], 0144. Accordingly, a POSA would understand the deposition apparatus would include a supply of the compounds of R_nSnX_{4-n} to prepare the first precursor vapor. <i>Id.</i> \. Meyers '612 also teaches specific examples of compounds of R_nSnX_{4-n} (e.g. $(CH_3)_2CHSn(NMe_2)_3$, where $n = 1$ and R is $(CH_3)_2CH-$ (isopropyl group, which has 3 carbon atoms) and where the CH group is bonded directly to tin forming a metal-carbon bond. Meyers '612, ¶¶ 0051, 0080; <i>id.</i>, 33:33-36. In the combination, this compound is provided in Weidman '068's ampoule (the supply of the organotin).
[1f] wherein X is selected from the group consisting of alkylamido or dialkylamido ($—NR^1R^2$, where R^1 and R^2 are independently hydrocarbon groups with 1-10 carbon atoms or hydrogen), siloxo ($—OSiR^1R^2R^3$, where R^1, R^2, R^3 are independently hydrocarbon groups with 1-10 carbon atoms), silylamido ($—N(SiR^1)_3(R^2)$, where R^1 and R^2 are independently hydrocarbon groups with 1-10 carbon atoms), disilylamido ($—N(SiR^1)_3(SiR^2)_3$ where R^1 and R^2 are independently hydrocarbon groups with 1-10 carbon atoms), alkoxo and aryloxo ($—OR$, where R is an alkyl or aryl group with 1-10 carbon atoms), azido ($—N_3$), alkynido ($—C≡CR$, where R is a	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches the claimed X group limitation because it discloses a method for forming a radiation patternable coating using vapor deposition, including inputting into a deposition chamber a first precursor vapor including a compound having the formula R_nSnX_{4-n} where $n=1$ in which R is a hydrocarbyl group with 1-31 carbon atoms and X is a hydrolysable or oxidizable ligand. <i>Id.</i>, ¶¶ 0080; 0041-0042, 0056 (describing list of suitable ligands identical to claim language) (“Suitable ligands comprise alkylamido or dialkylamido ...siloxo...silylamido...disilylamido...alkoxo and aryloxo...alkynido...amidato...amidinato...or fluorinated analogues thereof.”).

'048 Patent Claims	Disclosure of Prior Art
hydrocarbon group with 1-9 carbon atoms), amidato ($\text{---NR}^1(\text{COR}^2)$ where R^1 and R^2 are independently hydrocarbon groups with 1-7 carbon atoms or hydrogen), amidinato ($\text{---NR}^1\text{C}(\text{NR}^2)\text{R}^3$) where R^1 and R^2 are independently hydrocarbon groups with 1-8 carbon atoms or hydrogen), imido ($\text{---N}(\text{COR}^1)(\text{COR}^2)$, where R^1 and R^2 are independently hydrocarbon groups with 1-8 carbon atoms or hydrogen), or fluorinated analogues thereof, or combinations thereof	
[1g] structure configured to deliver flow of a first precursor vapor from the supply of the organotin compound with the inert gas as a carrier gas to the inlet	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. The structure for this MPF term based on Figure 16 of the '048 Patent is “the conduit extending from the vessel 168 to the inlet 152” and equivalents thereof or, if not tied to Figure 16, “a class of structures for delivering flow, e.g., a conduit (such as a pipe)” from an interconnected vessel (such as a vaporization chamber, as recited in claim 4), and equivalents thereof.

'048 Patent Claims	Disclosure of Prior Art
	Figure 16:  Meyers '612 discloses the source and chamber, and Weidman '068 discloses the structure for delivering flow between them. Weidman '068 describes “[p]urge and inert gases such as argon and nitrogen in fluid communication with gas inlets for each of the reactants and gases,” and notes “[e]ach inlet may be controlled by an appropriate flow controller such as a mass flow controller or volume flow controller in communication with a central processing unit (CPU) that allows flow of each of the reactants to the substrate to perform a[n] ALD process.” Weidman '068, 7:48-57. Weidman '068's “processing chamber would include separate supplies of the A, B, and C reactants, along with a supply of carrier, purge and inert gases...in fluid communication with gas inlets for each of the reactants and gases” and that “[t]he substrate...can be exposed to a metal-containing ‘A’ precursor gas or vapor formed by passing a carrier gas...through an ampoule of the precursor...can be delivered at any suitable flow rate...” <i>Id.</i>, 11:65-12:2. Weidman '068 also discloses that “the various gases for the process may be pulsed into an inlet through a gas channel, from various holes or outlets, and into a central channel.” <i>Id.</i>, 8:16-20. As such, Weidman '068 discloses conduits like gas channels, outlets, central channels with flow controllers to supply precursor gases to the chamber.

'048 Patent Claims	Disclosure of Prior Art
	As set forth in the parties' claim construction filings, the parties have disputed the meaning of this limitation. The structure disclosed in the Meyers '618 and Weidman '068 references, as identified above, meets this limitation under both parties' proposed constructions Thus, Meyers '612 +Weidman '068 discloses a structure to deliver a first precursor vapor (e.g., above precursors) from the supply of the organotin compound (e.g., the ampoule with Meyer's precursor) with the inert gas as a carrier gas (e.g., argon) to the inlet.
l[h] to provide for formation of an organotin layer on the substrate within the deposition chamber	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 describes “vapor deposition methods for deposition of organotin oxide hydroxide thin-film photoresists. Potential deposition methods include, for example, physical vapor deposition (PVD), chemical vapor deposition (CVD), atomic layer deposition (ALD), or modifications thereof” where “one or more gaseous $RnSnX(4-n)$ compounds can be introduced to a reaction chamber and reacted with a co-precursor such as H_2O ... thereby producing a radiation sensitive organotin oxide hydroxide coating. Meyers '612, ¶ 0033. Meyers '612 notes that the ALD process can include sequentially adsorbing, chemisorbed, or decomposed the precursor on a “substrate surface.”
[li] structure to deliver a second precursor vapor comprising water, hydrogen peroxide or a combination thereof capable of reacting with the composition in the first precursor vapor	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. The structure based on Figure 16 of the '048 Patent is a conduit 174 connecting a source of a “second precursor vapor comprising water, hydrogen peroxide or a combination thereof” to inlet 154 of deposition chamber 151 and equivalents thereof or, if not tied to Figure 16, a conduit (e.g., pipe) connecting a source of a “second precursor vapor comprising water, hydrogen peroxide or a combination thereof” to an inlet of a deposition chamber and equivalents thereof. Meyers '612 teaches an inlet (i.e., a pipe) for delivering into the chamber a secondary precursor vapor (secondary reactant) that is capable of reacting (hydrolysis/oxidation) with the composition

'048 Patent Claims	Disclosure of Prior Art
	comprising a compound described by the formula $R\text{SnX}_3$. Meyers '618 teaches that the second precursor vapor can include water. Meyers '612, ¶¶ 0079, 0081. (“hydrolysable compounds can be directly deposited via vapor phase hydrolysis as the corresponding alkyl tin oxide hydroxide coating, which can then be appropriately patterned. Advantages of vapor deposition may include, for example, reduced resist film defect density, improved thickness and compositional uniformity”). Alternatively, Weidman '068 discloses that the apparatus includes supplies of A, B, and C reactants. B reactants can include water (H_2O) or hydrogen peroxide (H_2O_2). Weidman '068, 5:55-65, 8:48-52, 10:1-10, 16:4-7. Weidman '068's B reactant is delivered to the substrate by passing a gas through an ampoule (i.e., a structure configured to deliver a second precursor vapor). <i>Id.</i>, 12:38-41. As Weidman '068 describes, “the various gases for the process may be pulsed into an inlet through a gas channel, from various holes or outlets, and into a central channel.” <i>Id.</i>, 8:16-20. Thus, Meyers '612 and Weidman '068 disclose a structure (e.g., gas channels etc.) to deliver a second precursor vapor comprising water, hydrogen peroxide or a combination thereof capable of reacting with the composition in the first precursor vapor.
[1j] under conditions in the deposition chamber to form a composition with non-volatile components and a volatile component comprising hydrolysis reaction product with X	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612's method for forming a radiation patternable coating using vapor deposition includes inputting a first precursor vapor comprising $R_n\text{SnX}_{4-n}$ (n can be 1, Meyers '612, ¶¶ 0143-0145, where “X is a ligand having a hydrolysable bond with Sn” under conditions in the chamber “to form a composition with non-volatile components and a volatile component comprising a reaction product with X ligand or ligands.” <i>Id.</i>
[1k] wherein the substrate is configured with a surface to receive the non-volatile components of the composition.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation.

'048 Patent Claims	Disclosure of Prior Art
	Meyers '612 discloses "wherein a substrate is configured with a surface to receive the non-volatile components of the composition." Meyers '612, ¶ 0145(as part of a recitation of a method for forming a radiation patternable coating).
Claim 2	
The system of claim 1 wherein the substrate comprises a silicon wafer.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 + Weidman '068 discloses claim 2, which recites "the substrate comprises a silicon wafer." Meyers '618 states: "substrates of particular interest include, for example, silicon wafers." Meyers '612, ¶0069. Additionally, Weidman '068's substrate can be a silicon wafer (e.g., "200 mm or 300 mm diameter wafers" comprising "crystalline silicon," "silicon oxide," "strained silicon," etc.). Weidman '068, 7:30-41. Meyers '612 describes that "[a] coating material can be formed through deposition and subsequent processing of the precursor solution onto a selected substrate," and that "[s]ome substrates of particular interest include, for example, silicon wafers." <i>Id.</i>, ¶ 0069 (emphasis added).
Claim 3	
The system of claim 1 wherein the inert gas comprises nitrogen or argon .	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 discloses that, "[t]o facilitate deposition the substrate may be heated or may be cooled depending on the precursor properties," and that "[i]nert gases such as N₂, Ar or the like may be used in appropriate capacities as carrier gases." Meyers '612, ¶ 0079. Weidman '068 also discloses that the apparatus includes a supply of inert gases such as argon and nitrogen and an inlet to supply the inert gas to the deposition chamber. Weidman '068, 8:48-52.
Claim 4	
The system of claim 1 wherein the structure configured to deliver flow comprises	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation.

'048 Patent Claims	Disclosure of Prior Art
an aerosol generator configured to generate an aerosol from a liquid comprising the organotin compound, a vaporization chamber configured to receive an injection of organotin compound, a flash evaporator configured to evaporate the organotin compound, <u>or</u> a bubbler configured for bubbling an inert carrier gas through a liquid comprising the organotin compound, and	Meyers '612 discloses “bubbler vessels....” Meyers '612, ¶ 0082. Meyers '612 also teaches a method for forming a radiation patternable film using CVD, including methods for delivering flow that result from the claimed structures configured to deliver flow. <i>Id.</i>, ¶ 0079(“precursors with relatively low vapor pressures may be introduced using flow of vapor, aerosol, and/or direct liquid injection into a vaporization chamber”). Weidman '068 also teaches a bubbler (an ampoule of precursor liquid through which a carrier gas is passed). Weidman '068, 13:16-20.
wherein the deposition on the surface of the substrate comprises chemical vapor deposition.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612's deposition (the hydrolyzed or oxidized composition formed in the deposition chamber) on a substrate's surface was conducted using chemical vapor deposition (“CVD”). Meyers '612, ¶¶ 0033; 0073. Weidman '068 also discloses devices “configured to operate in both an ALD mode as well as a conventional CVD mode” “to deposit photoresist materials.” Weidman '068, 9:12-15.
Claim 5	

'048 Patent Claims	Disclosure of Prior Art
The system of claim 1 wherein the second precursor vapor comprises water vapor .	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 lists H₂O as a small molecule gas-phase reagent used in vapor deposition. Meyers '612, ¶ 0077. Weidman '068 also discloses a non-metal reactant "B" can include "vapors of water." Weidman '068, 5:55-62, where the non-metal reactant "B" can be reasonably interpreted to be the second precursor recited in claim 5. Weidman '068, 5:55- 62.
Claim 6	
The system of claim 1 further comprising a flow comprising a third precursor vapor comprising a composition represented by the formula ML _v , where v is 2≤v≤6 and L is an oxidizable ligand or a ligand having a hydrolysable M-L bond or a combination thereof, and M is a metal selected from groups 2-16 of the periodic table.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches inputting into a deposition chamber a third precursor vapor with the formula ML_v. Meyers '612 discusses at ¶ 0145: The method of additional inventive concept 1 where a third precursor is separately inputted to the chamber the precursor comprising ML_v, where v is 2≤v≤6 and L is an oxidizable ligand or a ligand having a hydrolysable M-L bond or a combination thereof, and M is a metal selected from groups 2-16 of the periodic table.
Claim 7	
The System of claim 6 wherein the third precursor vapor comprises SnL ₄ .	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches compounds of formula SnL₄ (Sn(NMe₂)₄ or Sn(OtBu)₄ wherein L₄ = (NMe₂)₄ or (OtBu)₄). Meyers '618 teaches a third precursor comprising ML_v can be inputted into the chamber (third precursor vapor). Sn(NMe₂)₄ and Sn(OtBu)₄ are compounds of ML_v where v is 4 and L is a ligand having a hydrolysable M-L bond and M is a metal of group 14 of the periodic

'048 Patent Claims	Disclosure of Prior Art
	table. Meyers '612, ¶ 0080 (“A range of $R_n\text{SnX}_{(4-n)}$ compounds where $n=0,1$, or 2 or combinations thereof, as demonstrated to produce organotin oxide hydroxide photoresists by hydrolysis in solution or in-situ hydrolysis as discussed herein, may also be suitable for vapor deposition of organotin oxide hydroxide photoresists with desirable properties.”) Accordingly, a POSA would understand that the third precursor vapor can comprise $\text{Sn}(\text{NMe}_2)_4$ or $\text{Sn}(\text{OtBu})_4$. <i>Id.</i>.
Claim 8	
The system of claim 1 wherein the interior has a pressure from about 0.01 Torr to about 25 Torr.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches a chamber having the claimed interior pressure: “By controlling vessel 44 temperatures, inert gas flow rate, and total system pressure, vapor-phase $\text{RSn}(\text{NR}'_2)_3$ and H_2O are transported independently to a chamber evacuated to 25 Torr.” Meyers '612, ¶0082; <i>see also id.</i>, ¶ 0145. Meyers '618 also recites “[a] method for forming a radiation patternable coating comprising an oxo-hydroxo network with metal cations having organic ligands with metal carbon bonds and metal oxygen bonds,” where “the deposition chamber has a pressure from about 0.01 Torr to about 25 Torr.” <i>Id.</i>.
Claim 9	
The system of claim 1 wherein the interior has a temperature from about 40° C. to about 175° C.	Meyers '612 and Weidman '068 discloses claim 9, which depends on claim 1. Meyers '612 teaches the interior of the deposition chamber (e.g., chamber walls) has “a temperature from about 40° C. to about 175° C.” <i>Id.</i>, ¶0082.
Claim 10	
The system of claim 1 comprising a configuration providing for selection of the pressure and/or	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation.

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the temperature in the deposition chamber.	In Meyers '612, the temperature in the reaction chamber can be selected to control the reaction process. Meyers '612, 0082. Weidman '068's "substrate temperature and chemistry can be selected specifically not to promote formation of an insoluble oxide precursor material, but to remain soluble unless exposed to far UV or EUV radiation." Weidman '068, 15:56-60. And Weidman '068's CPU "can be used in an industrial setting for controlling various chambers and sub-processors." Weidman '068, 7:57-60. It would be obvious to a POSA to use this CPU to select and control substrate temperature and pressure.
Claim 14	
The system of claim 1 wherein a first vapor inputting structure is configured to deliver a first vapor flow and a second vapor inputting structure is configured to deliver a second vapor flow at the same time.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches inputting a second precursor vapor "at the same time" as a first precursor vapor. Meyers '612, ¶0145. Meyers '612 also teaches CVD as a potential deposition method, which includes a continuous deposition process. Meyers '612, ¶0033; <i>see id.</i>, ¶ 0078 ("In CVD methods, two or more reactant gases are generally mixed in the chamber in the vicinity of the substrate surface"). Weidman '068 describes "a first precursor inlet in fluid communication with a supply of a first precursor containing substituents with cross-linkable moieties." Weidman '068 '618, 8:47-49. Additionally, Weidman '068's "'A', 'B', and purge gases can flow simultaneously, and the substrate and/or gas flow nozzle can oscillate such that the substrate is sequentially exposed to the A, purge, and B gases as desired." <i>Id.</i>, 6:17- 21.
Claim 15	
The system of claim 1 wherein a first vapor inputting structure is configured to deliver a first vapor flow and a second vapor inputting	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation.

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structure is configured to deliver a second vapor flow, wherein the first vapor flow and the second vapor flow are sequential.	Meyers '612 teaches inputting a first precursor vapor and a second precursor vapor sequentially. Meyers '612, ¶0145. Meyers '612 also teaches ALD as a potential deposition method, which includes a sequential deposition process. Meyers '612, 0078. Further, Weidman '068's "method for forming a radiation sensitive photoresist on a substrate" includes "exposing a substrate sequentially to alternating pulses of a first precursor containing substituents with cross-linkable moieties and a reactant selected from...H₂O, H₂O₂...to form a deposited layer...." Weidman '068, claim 1.
Claim 16	
The system of claim 1 wherein a first vapor inputting structure is configured to deliver a first vapor flow and a second vapor inputting structure is configured to deliver a second vapor flow, wherein the first vapor flow, the second vapor flow, and a third vapor flow are sequential.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches (i) a first and second vapor flow can be delivered sequentially, and (ii) inputting a third precursor vapor flow into a deposition chamber. Meyers '612's "one or more vapor-phase precursor compounds ... such as Sn(NMe₂)₄ or Sn(OtBu)₄" "may be reacted sequentially ... with the organotin-containing precursors." Meyers '618, ¶0080. Meyers '612 also teaches that ALD (which includes sequential deposition) is a suitable method. <i>Id.</i>, ¶0077. Accordingly, a POSA would understand that the third vapor flow could also be delivered sequentially along with a first and second vapor flow using ALD. Weidman '068's "apparatus includes a first precursor inlet in fluid communication with a supply of a first precursor containing substituents with cross-linkable moieties." Weidman '068, 8:47-49; 9:29-42 ("an ALD process cycle may include alternating pulses of 'A' precursor..., 'B' reactant, 'C' precursor..., and 'B' reactant"). Weidman '068's "'A', 'B', and purge gases can flow simultaneously, and the substrate and/or gas flow nozzle can oscillate such that the substrate is sequentially exposed to the A, purge, and B gases as desired." <i>Id.</i>, 6:17-21. A POSA would also understand that there are a limited number of obvious choices of continuous or alternating delivery methods, which would have been obvious-to-try.

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Claim 17	
The system of claim 1 wherein a first vapor inputting structure is configured to deliver a first vapor flow and a second vapor inputting structure is configured to deliver a second vapor flow, wherein the first vapor flow and the second vapor flow are at the same time and a third vapor flow is sequential.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches a first precursor vapor (first vapor flow) and a second precursor vapor (second vapor flow) can be delivered at the same time and also teaches a third precursor vapor being “separately inputted” into a deposition chamber (a third vapor flow). Meyers '618, ¶¶ 0078; 0145. Meyers '612 also teaches CVD, which includes a continuous deposition process, and ALD, which includes a sequential deposition process. <i>Id.</i>, ¶ 0033. Meyers '612 teaches the first and second vapor flows can be “input sequentially” and that the third vapor flow can be “separately inputted to the chamber.” <i>Id.</i>, ¶00145. Specifically, vapor-phase precursors such as Sn(NMe₂)₄ or Sn(OtBu)₄ can be input sequentially with organotin-containing precursors to alter the R:Sn ratio. <i>Id.</i>, ¶ 0080. And both CVD (which includes a continuous deposition process) and ALD (which includes a sequential deposition process) are suitable deposition methods. Weidman '068 also discloses “both an ALD mode as well as a conventional CVD mode may be used to deposit photoresist material” and that ALD process cycles may include alternating pulses of different precursors. Weidman '068, 9:12-15. Thus, a POSA would know that varying which precursors are introduced at the same time or sequentially is a simple design choice that would be obvious to try.
Claim 18	
The system of claim 1 wherein the interior has a temperature from about 45° C. to about 200° C.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612's deposition chamber has a temperature from about 40° C. to about 175° C, which overlaps with the claimed range. Meyers '612, ¶ 0082. Additionally, Weidman '068's “chamber or

'048 Patent Claims	Disclosure of Prior Art
	substrate may be heated to a temperature of...less than about 200° C ... or less than about 100°.” Weidman '068, 9:21-26.
Claim 19	
The system of claim 1 wherein X is alkylamido or dialkylamido.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches that useful X ligands include alkylamido and dialkylamido, and discloses specific examples of compounds of RSnX_3 where X is dialkylamido ($\text{—NR}^1\text{R}^2$, where R^1 and R^2 are independently hydrocarbon groups with 1-10 carbon atoms or hydrogen; —NMe_2 is a dialkylamido group where R^1 and R^2 are each methyl (Me), which is a hydrocarbon group with 1 carbon atom). Meyers '612, ¶ 0080.
Claim 20	
The system of claim 1 wherein X is alkoxo and aryloxo.	Meyers '612, alone, in combination with the general knowledge of a person of ordinary skill in the art, and/or in combination with the other references identified, discloses and/or suggests this claim limitation. Meyers '612 teaches that useful X ligands include alkoxo and aryloxo, and discloses specific examples of compounds of RSnX_3 where X is alkoxo (—OR, where R is an alkyl group with 1- 10 carbon atoms; —OtBu is an alkoxo group where R is t-butyl, which is an alkyl group with 4 carbon atoms). <i>Id.</i>, ¶ 0080.