

ALD NANOSOLUTIONS

INTELLECTUAL PROPERTY



BROAD AND ADVANCED ALD IP

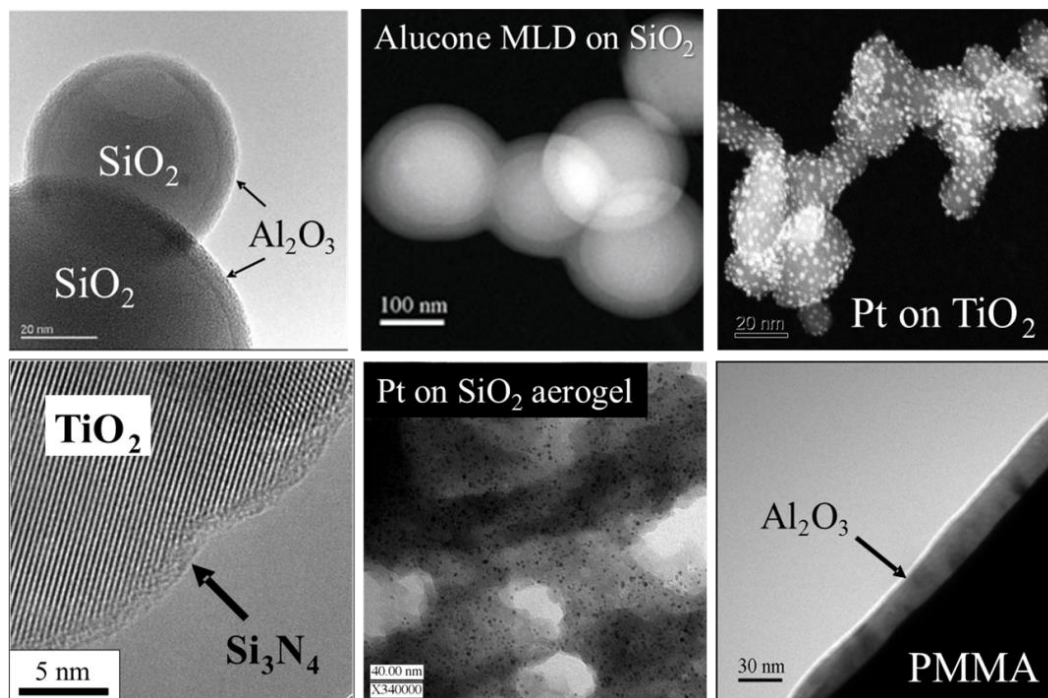
ALD NanoSolutions, Inc. (ALDN) is the first company to carry out atomic layer deposition on particle surfaces. Because of this innovation, the U.S. Patent office has allowed broad based process and composition of matter patent claims for ALD coatings on particles, including over 100 related claims. ALDN has exclusive rights to Particle ALD and is the only entity in the world that can grant access to practice Particle ALD or to sell Particle ALD coated materials in the United States, Canada, Japan, Belgium, Germany, UK, Finland, France and Italy. ALDN can provide the research equipment today, help you to develop your products, consult on scale up, and provide the IP rights and protection.

HIGHLIGHTED IP

U.S. PATENT 6,613,383: *CLAIM 26.* "A method for depositing an ultrathin coating on particles comprising conducting a sequence of two or more self-limiting reactions at the surface of said particles to form an ultrathin coating bonded to the surface of said particles."

U.S. PATENT 6,713,177 (ALSO ISSUED IN EP AND ELSEWHERE): *CLAIM 1.* "A material in the form of non-agglomerated particles having an average diameter of less than about 500 microns, comprising substrate particles having an ultrathin film of an inorganic material deposited on the surface thereof.";

U.S. PATENT 6,913,827: *CLAIM 1.* "A material in the form of non-agglomerated particles, comprising substrate particles less than about 500 microns in size having on the surface thereof an inorganic film formed by an atomic layer deposition process, wherein the inorganic film has a thickness of up to 100 nanometers."



¹Hakim, LF et al, Nanotechnology, 16, S375 (2005); Liang, XH et al, AIChE Journal, 55, 1030 (2009);

Li, J. *et al.*, Applied Catalysis B – Environmental, 97, 220 (2010); Liang, XH et al., ACS Catalysis, 1, 1162 (2011);

Liang, XH et al., J Amer. Ceramic Soc., 90, 57 (2007);

ALDN ISSUED IP PORTFOLIO

Title	Status	Patent Number	Issue Date
<i>Atomic Layer Controlled Deposition on Particle Surfaces</i>	Issued	US 6,613,383	9/2/2003
<i>Insulating and Functionalizing Fine Metal-Containing Particles with Conformal Ultra-thin Films</i>	Issued; registered in BE, DE, GB, FI, FR, IT	US 6,713,177 EP 1412175B1 JP 4507598B CA 245231C	3/30/2004 6/9/2009 7/21/2010 11/2/2010
<i>Nanocoated Primary Particles and Method for their Manufacture</i>	Issued	US 6,913,827	7/5/2005
<i>Nanomaterials for Quantum Tunneling Varistors</i>	Issued	US 7,132,697	11/7/2006
<i>Dental Composite Filler Particles</i>	Issued	US 7,396,862	7/8/2008
<i>Titanium Dioxide Particles Coated via an Atomic Layer Deposition Process</i>	Issued	US 8,133,531	3/13/2012
<i>Methods for Producing Coated Phosphors and Host Material Particles using Atomic Layer Deposition Methods</i>	Issued	US 8,163,336 US 8,637,156	4/24/2012 1/28/2014
<i>Metal Ferrite Spinel Energy Storage Devices and Methods for Making and Using Same</i>	Issued	US 8,187,731	5/29/2012
<i>Zinc Anode Battery with Boron Nitride Coated Zinc Particles</i>	Issued	US 8,900,761	12/2/2014
<i>Method For The Deposition Of An Inorganic Film On An Organic Polymer Surface Using Atomic Layer Deposition Techniques</i>	Issued	JP 4295614 CA 2452656C EP 1425110	7/19/2009 4/13/2010 9/3/2014
<i>Protective Coatings for Organic Electronic Devices Made using Atomic Layer Deposition and Molecular Layer Deposition Techniques</i>	Issued	JP 5220106	5/2/2013
<i>Atomic Layer Deposition on Micro-Mechanical Devices</i>	Issued	US 7,426,067	9/16/2008
<i>Al₂O₃ Atomic Layer Deposition to enhance the deposition of hydrophobic or hydrophilic Coatings on Micro-Electromechanical devices.</i>	Issued	US 7,553,686	6/30/2009
<i>A Solid Material Comprising a Thin Metal Film On Its Surface And Methods For Producing Same</i>	Issued	US 6,958,174	10/25/2005
<i>Molecular Layer Deposition Process for Making Organic or Organic-Inorganic Polymers for making Organic or Organic-Inorganic Polymers</i>	Issued	KR 10-1449076	7/3/2014

WHY CHOOSE ALD NANOSOLUTIONS?

EXPERIENCE AND COLLABORATION: ALDN has a core competency of product development and customer collaboration to create products around our IP portfolio.

IP AND LICENSING: Our co-founders invented Particle ALD and ALDN has exclusive worldwide rights to practice and to sublicense broadly issued Particle ALD patents. Flagship patents include base IP for all ALD thin film coatings on particles, independent of chemistry and application. Each ALDN reactor comes with a license for Particle ALD research. Further, by working with ALDN, customers are directly engaged with the only entity in the world that can provide the right to commercially produce Particle ALD coated materials.

STABILITY AND SUPPORT: ALDN is a privately held company, founded in 2001. Our business is ALD onto particles and, now, equipment for particles. We can help customers develop new material, supply the equipment to make it, and the IP to protect it. This development expertise is a significant benefit of choosing ALD NanoSolutions.

CONTACT US

EMAIL YOUR QUESTIONS TO info@aldnanosolutions.com

OR CALL 303-318-4144



www.aldnanosolutions.com
info@aldnanosolutions.com

580 Burbank Street, Unit 100
Broomfield, CO 80020
p: 303.318.4144