# ALD Research and Development at Argonne

Argonne is available for industry-sponsored research and development in ALD technology

Capabilities and Expertise

Our group has experience in many aspects of ALD technology including process development, equipment design and fabrication, process scale-up, and modeling of feature- and reactor-scale phenomena. We currently have eight ALD systems ranging from bench-scale reactors for process development on small coupons to a commercial ALD tool capable of batch-coating multiple 400 mm substrates. We also have an ALD powder coating system designed for kg-scale catalyst manufacturing and a plasma-enhanced ALD tool. Our materials expertise includes: oxides, metals, nitrides, and sulfides; nanolaminates, alloys, and doped materials; synthesis and functionalization of nanoparticles; precision coating of porous and nanostructured materials. Complementing these synthetic capabilities we have a broad suite of characterization tools available at Argonne including synchrotron X-ray measurements at the Advanced Photon Source. In addition to performing industry-sponsored R&D, we perform toll coating of specialty materials and offer licenses to our growing IP portfolio in ALD technology.
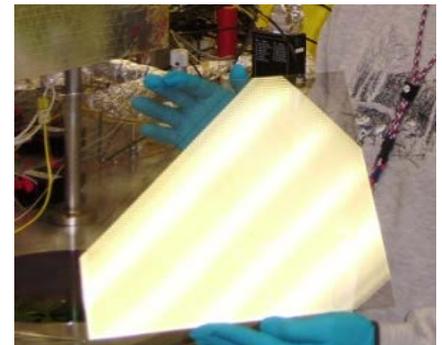

ALD ITO on 12" Substrate

Application Examples

We have ongoing programs developing new materials and applying ALD techniques to a range of applications in energy technology and other fields:

- Photovoltaics – TCO and semiconductor films, 3D architectures

- Catalysts – selective oxidation, hydrotreating, hydrogen production

- Nanostructured Membranes – separations and catalysts

- Barrier Layers – hermetic encapsulation, moisture barriers

- Energy Storage – lithium battery electrode materials, coatings, electrolytes

- Large Area Detectors – resistive and emissive layers for electron multipliers
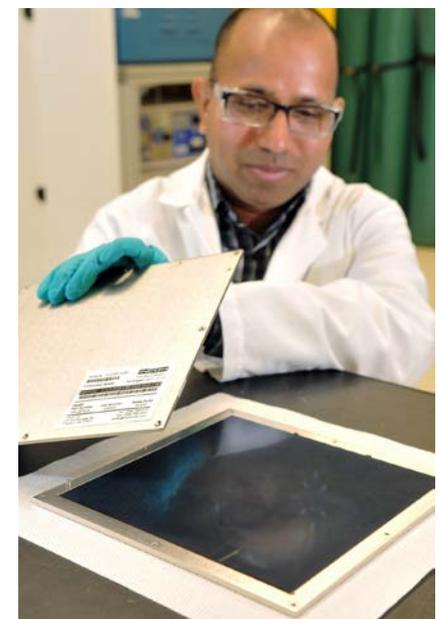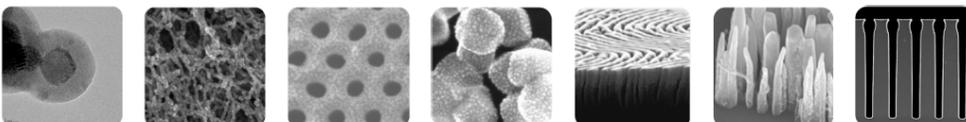
8x8" ALD Microchannel Plate

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http://www.anl.gov/energy-systems/group/advanced-materials-and-manufacturing