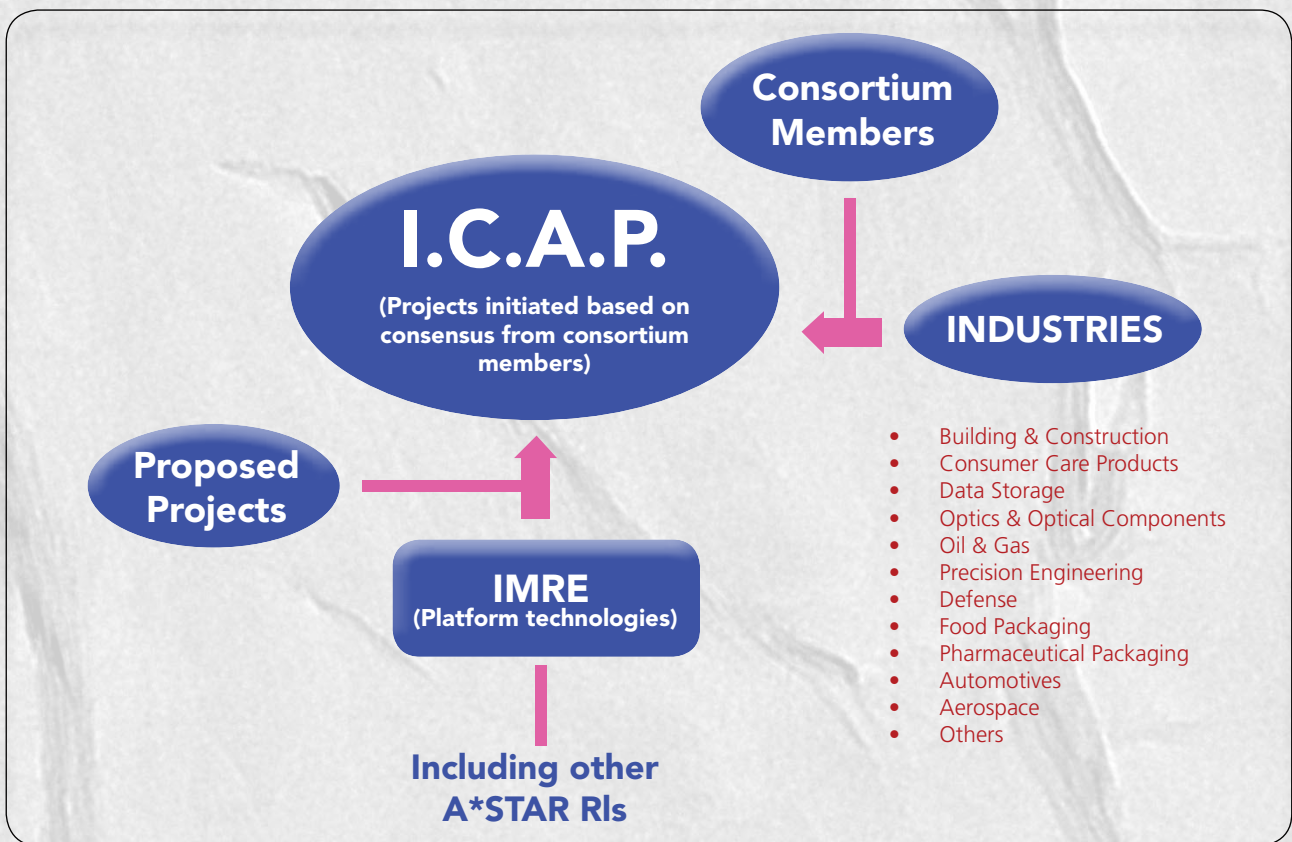


I.C.A.P.

Industrial Coating And Packaging Consortium



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Ceramic Coating: The topography of an electrically conducting ceramic thin film.

Ionomer Surface: An amphiphilic coating surface where white spots represent ionic clusters that concentrate and stabilize negative charges.

EMI on Elastomer: Ni-P alloy coating on silicone rubber for electromagnetic interference shielding.

Atomic Layer Deposition: SEM image of TiO₂ nanotube arrays (TNA) grown on glass. This is to demonstrate the conformal coating of the nanoscale film by atomic layer deposition (ALD) technology.

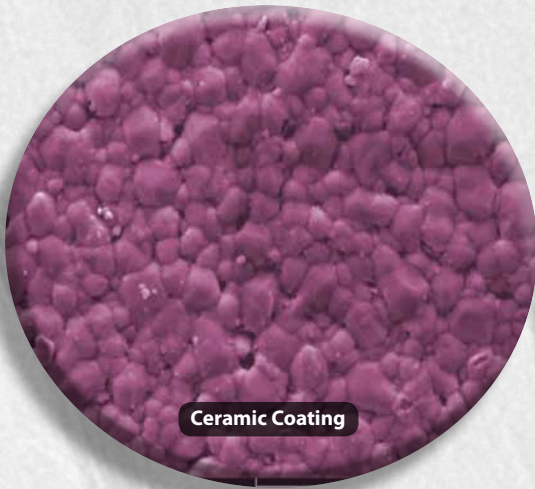
Coating with Imbedded Functionality: Growth of submicron metal wedges in a patterned polymer coating surface.



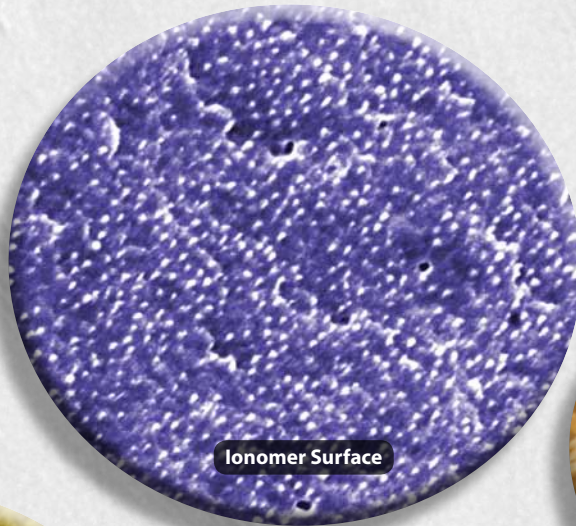
Agency for
Science, Technology
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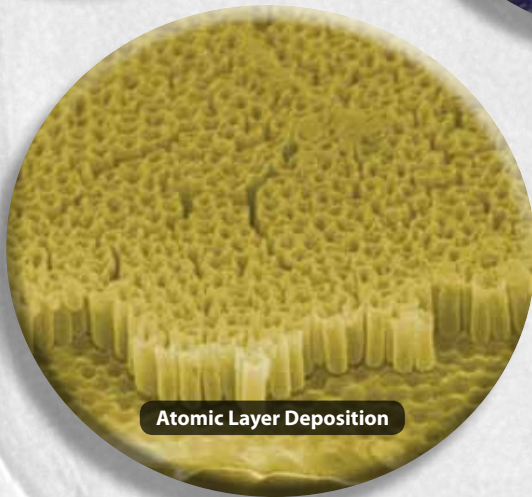
Ceramic Coating



Ionomer Surface



EMI on Elastomer



Atomic Layer Deposition



Coating with Imbedded
Functionality

Hosted by:



Institute of
Materials Research
and Engineering

Supported by:



I.C.A.P.

Industrial Coating And Packaging Consortium

Industrial Coating And Packaging Consortium (I.C.A.P.)

VISION

A leading consortium to drive innovations in industrial coating and packaging in Singapore

MISSION

To advance pre-competitive research in industrial coating and packaging so as to enable the adoption of these platform technologies through synergistic partnerships

Industrial Coatings cover a broad range of market segments and serve diverse applications. In recent years, manufacturers of coatings have seen their customer base expand with demand for high-performance customised coatings for critical components and equipment such as those used for building, consumer care, automotive, aerospace, oil and gas industries. However, manufacturers have also had to grapple with rising raw material and energy costs and increased regulatory restrictions.

Likewise, the global **packaging industry** is expected to reach \$530 billion in 2014*. \$170 billion will be spent on developing and marketing sustainable packaging* that addresses issue facing the environment such as the use of raw materials, energy, transportation, and disposal. To reduce this environmental impact, the packaging industry must incorporate designs with

minimal packaging that can be easily reclaimed, develop low energy usage production and create environment-friendly packaging materials.

The Industrial Coating And Packaging Consortium

The Industrial Coating And Packaging (I.C.A.P.) Consortium is a platform that helps companies reduce R&D risks and investments in new coating and packaging technologies by synergistically pooling R&D resources in pre-competitive projects. By doing so, companies can enhance and build new capabilities that will enable new product development or improve existing products and processes. Manufacturers need to keep abreast of new coating and packaging technologies and process developments that can help them meet the current challenges and requirements.

*These sources are from Pike Research

BENEFITS OF JOINING I.C.A.P.

- Pool Resources - Synergistic pooling of R&D resources to achieve common goal by reducing R&D risks and investments.
- Access to Advanced R&D - Access to advanced coating technologies and packaging technologies in a platform conducive for solving technical and fundamental problems at the pre-competitive level.
- Competitive Advantage – The latest in coating and packaging technologies enhances core competencies and competitive advantage.
- Networking – The consortium creates technology and business networking opportunities with along the entire length of the coating and packaging industry value chain.

I.C.A.P. PLATFORM TECHNOLOGIES

Transparent, Firmer and More Impermeable - Hierarchically Layered Polymer Composite

Polymer with oriented and stacked silicate sheets to provide dramatic improvements on hardness and barrier properties.

Uniqueness

High hardness
Very good barrier property
Transparent and flexible film
Cost-effective process

Applications

Packaging Materials
Hardness coating
Fire-retardant coating
Corrosion-resistant coating
Scratch-resistant coating

Precise and Highly Uniform Thin Films that Mould to Fit Any Shape - Atomic Layer Deposition

Conformal nanofilm coating to provide multi-functional protection.

Uniqueness

Conformal coating on 3D objects
Pinhole-free film
Precise growth control: 1Å/cycle
Chemical bonding to base substrate
Excellent uniformity over large area
Multi-function, laminated coating

Applications

Corrosion/Wear-resistant coating
Tarnish-resistant coating
Biocompatible coating
Anti-stickiness coating
Antireflective coating
Moisture/Oxygen barrier coating

Abrasion and Scratch-Resistant Hard Coatings - UV Curable Hybrid Hard Coating

Silicone reinforced polymer coating to provide dramatic improvements in surface hardness, scratch-resistance and mechanical strength.

Uniqueness

Abrasion and scratch resistant
Highly transparent
Rapid curing
Good adhesion to base substrate
Solvent-Free
Low viscosity (easy to process)

Applications

Scratch-resistant coating
Hydrophobic coating
Protective coatings for optical components

Heat Shielding and Sound Attenuation Coatings

Composite coating incorporated with core-shell microspheres to provide dramatic improvements in heat insulation and sound attenuation.

Uniqueness

Hybrid filler
Heat insulating
Sound attenuation
Chemical resistance
Electromagnetic interference shielding

Applications

Civil infrastructures
Green building
Automotives
Aerospace

Highest Level of Protection in the Deepest Seas - Hybrid Polymer Composite Coating with Cathodic Protection Filler

Epoxy coating with cathodic protection (CP) filler to protect ferric alloys from harsh environments.

Uniqueness

Anti-corrosion coating for severe hostile environment
Strong cohesive bonding between filler and matrix
Low water diffusivity (<10⁻⁸ cm²/s) at elevated temperatures (up to 1000C) and pressures (ca. 25 to 50 atm)

Applications

Offshore infrastructure
Deepwater equipment
Bridges and civil structures
Automotives
Aerospace