HYBRID POLYMER/NANOPARTICLE MULTI-FUNCTIONAL OPTICAL COATINGS

Sandia National Laboratories

intellectual property MANAGEMENT, LICENSING, & ALLIANCES

TECHNOLOGY READINESS LEVEL: 4

KEY COMPONENTS OF THIS TECHNOLOGY HAVE BEEN DEMONSTRATED IN RELEVANT ENVIRONMENTS.

US PATENT # 8,288,001

ADDITIONAL PATENTS PENDING

TECHNOLOGY SUMMARY

Feature	Our Process	CVD	Sputtering
1) Equipment Costs	$5-50K	$3-10M	$3-7M
2) Material Toxicity	Low	High	Low
3) Tunable Material Properties	Yes	Limited	Limited
4) Substrate Heating	Room Temp.	20 – 500 °C	20–600 °C
5) High Vacuum	Ambient Pressure	Typically Required	Required
6) Large/Irregular Parts	Easy	Difficult	Difficult
7) Surface Chemistry Functionalization	Yes	No	No
8) Controlled Atmosphere	None	Yes	Inert carrier

2 R&D 100 AWARDS

Hybrid polymer-nanocrystal optical coatings are a platform technology in the field of multilayered films, and are seen in a variety of consumer products. The methods currently used to manufacture and apply these coatings are complicated and require expensive techniques, such as sputter deposition and chemical vapor deposition (CVD), which both require the use of a vacuum for application.

The hybrid polymer-nanocrystal coatings designed at Sandia National Labs employ nanotechnology, which involves the self assembly of polymers to form stable, nanostructured coatings with tailored optical and physical properties. For the first time the optical and chemical properties of superhydrophobic and hydrophilic coatings can be independently controlled during manufacture. These tailored properties include porosity, refractive index, hydrophobicity, and surface geometry. This unique capability of Sandia's multifunctional coatings expands the potential applications into a variety of new markets.

POTENTIAL APPLICATIONS

- Superhydrophobic/Hydrophilic Coatings
- Consumer Electronics
- Anti-Reflective/Custom Coatings for Solar Panels, Windshields, Lenses, etc.
- High Performance Glass & Ceramics

TECHNOLOGICAL BENEFITS

- Easy Application (spray, dip, spin-on, reel-to-reel)
- Can be applied at ambient temperature and pressure
- Based on commercially available materials
- Can be used on large or irregular surfaces

TECHNOLOGY INQUIRY?

For more information or licensing opportunities contact us at

ip@sandia.gov

Refer to SD # 11306,11677,11923

or visit

https://ip.sandia.gov

NNSA National Nuclear Security Administration

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U.S. DEPARTMENT OF ENERGY