International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India

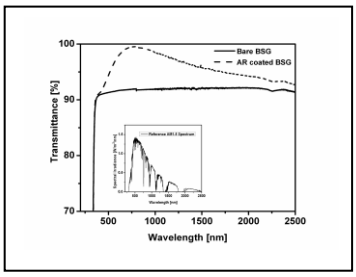
Scratch-Resistant, Single Layer Antireflective Coatings on Glass and Plastics

Overview

Glass and transparent plastics are principally used for optical applications and reflect about 8-12% of the visible light thereby decreasing transmission. Transparent plastics are being used extensively to replace glass in both industrial and domestic applications due to their low density and shock resistance. But transparent plastics are also easily prone to scratches and abrasion since they are soft in nature. Scratch resistant, anti reflective coatings (ARCs) can enhance their visible light transmission while maintaining excellent scratch resistance. From a technology point of view, single layer ARCs on glass and transparent plastics are viable for commercialization.

Key Features

- Visible light transmission ~ 97%
- Haze change after 1000 cycles of crockmeter testing using fabric: <2%
- Can be applied on Polycarbonate, PMMA and window glass
- Eco-friendly
- Low temperature ultraviolet (UV)/near-infrared (NIR) curability
- Amenability for deposition on large areas with automation



Transmittance spectrum of single layered antireflective coating on BSG

Potential Applications

- Smart windows
- Automobile windows
- Transparent glass for photovoltaic modules
- Protective glass cover for solar thermal heat collection elements
- Ophthalmic lenses
- Helmet visors
- Display glass for showcase
- Aircraft canopy

Photograph of object when viewed through (a) uncoated and (b) AR coated BSG substrate

Intellectual Property Development Indices (IPDI)

- Performance and stability validated at laboratory scale on coupons
- Scale-up and prototype validation to be carried out

Status	1	2	3	4	5	6	7	8	9	10

Major Patents / Publications

1. An improved composition for antireflective coating with improved mechanical properties and a process of coating the same, Indian patent application number 2330/DEL/ 2013 dtd 05-08-13.

2. S. Pavithra and R. Subasri, Sol-gel derived single layer zeolite-MgF_2 composite antireflective coatings with improved mechanical properties on polycarbonate, Journal of Coating Science and Technology 1 (2014) 8-16.

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