

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

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



Hard Coatings on Plastics

Overview

Plastics, especially transparent plastics are being used extensively for wide ranging applications such as windshields, headlamps and ophthalmic lenses due to their lightweight, impact resistance and low temperature formability etc. But they are prone to scratch and abrasion and hence, require a protective coating. In applications such as retro reflective lenses of pavement/road markers, the coated lenses need abrasion-resistance and outdoor durability to serve for a long time. Most critical requirements of all such coatings are low temperature processing and retaining transparency even after coating deposition. Sol-gel nanocomposite hard coatings, which can be cured at low temperatures, offer excellent scratch and abrasion resistance while maintaining transparency and hence, can successfully be used in wide ranging applications.

Key Features

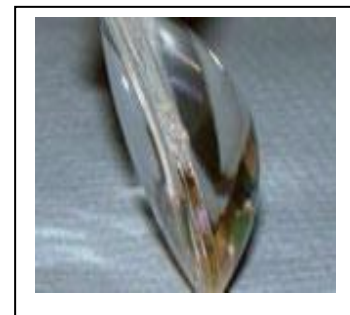
- High scratch hardness and abrasion resistance
- Long life
- Good adhesion
- Coloured coatings possible
- Can be coated on Polycarbonate, PMMA etc
- Can be made easy-to-clean with low surface free energy



Hard coating on retro reflective pavement marker

Potential Applications

- Road transport: Road and pavement markers
- Helmet visors
- Automotive headlamps/windshields
- Coloured head lamps for improved aesthetic appeal and style
- Ophthalmoscopic lenses
- Bi-aspheric lenses used in indirect ophthalmoscopy
- Aircraft canopy



Hard coating on PMMA bi-aspheric lens

Intellectual Property Development Indices (IPDI)

- Performance and stability validated at laboratory scale
- Scale-up and large area performance to be evaluated

Status	1	2	3	4	5	6	7	8	9	10
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Major Patents / Publications

1. Improved Scratch And Abrasion Resistant Compositions for Coating Plastic Surfaces, A Process for their Preparation and a Process for Coating using the Compositions, Indian Patent Application number: 2427/DEL/2010 dtd 12-10-10
2. S.T. Gururaj, R. Subasri, K.R.C. Soma Raju and G. Padmanabham, "Effect of Plasma pretreatment on adhesion and mechanical properties of UV-curable coatings on Plastics" Applied Surface Science 257 (2011) 4360–4364.
3. K.R.C. Soma Raju, L. Sowntharya, S. Lavanya and R. Subasri (2012) "Effect of plasma pretreatment on adhesion and mechanical properties of sol-gel nanocomposite coatings on polycarbonate", Composite Interfaces, 19:3-4, 259-270.

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