

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

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



## Decorative Nanocomposite Coatings on Glass and Ceramics

### Overview

There are principally two different methods to achieve intense colors in bulk glasses; one by incorporating transition metal cations into the glass network, which absorb visible light due to electronic transitions in their atomic orbitals and the other by addition of metal salts of Au, Ag or Cu, which are reduced to the metallic state during melting and segregate from the glass matrix while cooling. The colouring of glass via melting techniques has some unique problems with respect to reproducibility, toxicology during production & recycling and economics. When differently coloured bottles are mixed during the re-melting process for recycling, desired colours are very hard to obtain. Traditionally, the decoration of crystal glasses is performed by laborious manual techniques, which are costly and do not meet modern market requirements. Sol-gel coloured/decorative coatings are thin, low temperature curable, eco-friendly alternatives and are easy to recycle.

### Key Features

- Tuneable transmission and refractive index of the coatings
- Colour of the coating can be controlled by suitable choice of dopants
- UV, temperature stable and weather proof
- Easy recyclability of glass due to complete degradation of organic constituents at low temperatures
- Opaque coatings possible with high temperature durability

### Potential Applications

- Architectural applications: Coloured glasses/Tiles for aesthetics or decoration
- Scratch resistant, coloured coatings for glass bottles used in various industries for storing perfume, medicines etc

### Intellectual Property Development Indices (IPDI)

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



Coloured coatings on designer glass for interior applications



Transparent and opaque coloured scratch resistant coatings for glassware

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

1. Sol-Gel Nanocomposite Hard Coatings, K.R.C. Soma Raju and R. Subasri in "Anti-abrasive nanocoatings: Current and future applications", (ed.) M . Aliofkhazraei, Woodhead Publishing (an imprint of Elsevier), UK, 2015, pp 105-136.
2. R.Subasri, C.S.Madav, K.R.C.Somaraju and G.Padmanabham, "Decorative hydrophobic sol-gel coatings densified using near-infrared radiation" Surface and coating technology, vol 206 (8-9), p 2417-2421, 2012.

### Centre for Sol-Gel Coatings (CSOL)

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