

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

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



Glass-like Corrosion Protection Coatings for Metals and Stainless Steels

Overview

Stainless steels (SS) look attractive due to their lustre and texture depending on finishing process and are used in innumerable applications due to their strength, ease of formability and hardenability. Stainless steels get tarnished when used at high temperature and aluminium can easily corrode in a saline environment. Organic paints and toxic hexavalent chromium-based conversion coatings are conventionally being used to render corrosion protection. However, due to the toxic nature of hexavalent chromium, sol-gel coatings are considered as eco-friendly alternatives. Sol-gel glass like coatings developed by ARCI offer excellent abrasion resistance and protection against corrosion while being eco-friendly, maintaining transparency and gloss. These coatings offer excellent tarnish resistance up to 500°C and can even be made coloured by introducing suitable pigments.

Key Features

- Suitable for application on Al alloys and SS
- Anti-fingerprint, easy-to-clean
- High scratch hardness and abrasion resistance
- High temperature tarnish protection
- Low temperature curable compositions used as replacement for chrome-free primers
- Protection against acid attack and ion leaching

Potential Applications

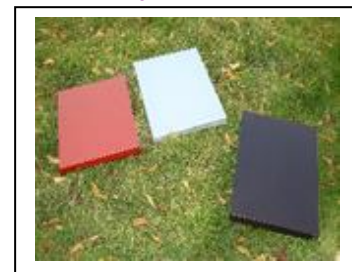
- Household appliances
- Medical/surgical instruments
- Automotive exhaust parts for motor cycles, cars etc.
- Architectural and interior decoration

Intellectual Property Development Indices (IPDI)

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



Transparent corrosion and scratch resistant coatings on carbon steel



Coloured tarnish resistant glass like coatings on stainless steel

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

1. An Improved Composition for Coating Metallic Surfaces and a Process for Coating such surfaces using the Composition, Indian patent application 620/DEL/2010 dtd 17-03-10.
2. R. Subasri, A. Jyothirmayi and D.S. Reddy (2010): Effect of plasma surface treatment and heat treatment ambience on mechanical and corrosion protection properties of hybrid sol-gel coatings on aluminum”, Surface and Coatings Technology, 205, 806-813.
3. P. Kiruthika, R. Subasri, A. Jyothirmayi, K. Sarvani, N.Y. Hebalkar (2010): Effect of Plasma Surface Treatment on Mechanical and Corrosion Protection Properties of UV-Curable Sol-Gel based GPTS-ZrO₂ Coatings on Mild Steel, Surface and Coatings Technology, 204 1270-1276.

Centre for Sol-Gel Coatings (CSOL)

ARCI, Balapur PO., Hyderabad 500005, Telangana, India

Tel : +91 40 24452465 Fax : +91 40 24442699

Email: subasri [at] arci [dot] res [dot] in / royjohnson [at] arci [dot] res [dot] in