Weatherable, Transparent, Scratch and Corrosion Resistant Coating Based on the Si-Ti Ceramers

We offer a novel advanced technology for the Weatherable, Transparent, Scratch and Corrosion Resistant Coating originally developed for protection of the photovoltaic modules as part of the SBIR Department of Energy Program. The coating potentially has a wide range of application for protection of various polymeric and metal surfaces, both in consumer's goods and high end technological applications. Currently, small pilot batches of the coating that is based on the organically modified Si-Ti sol-gels are manufactured by NAT and the sample coated panels are available for evaluation to the interested parties. We seek partners for co-development of the commercial process and manufacturing, as well as marketing and sales of the product. Exclusive rights to the technology are also possible.

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Selected Technical Parameters:

When coated onto Melinex 454 (Polyethylene terephthalate, PET) substrates and cured, the coating demonstrated:

- No cracking, voids, bubbles or delamination
- Excellent flexibility (no evidence of cracking) when tested per ASTM D522
- 5B rating on dry adhesion as tested per ASTM D3359
- 5B rating on wet adhesion per ASTM D3359 (after 4 hours DI water boil)
- Very high maximum use/operating temperature of 190°C
- No loss of adhesion or cracking in thermal cycling & humidity/freeze cycling
- Excellent dielectric properties per ASTM D149 (passed all testing)
- Minimal color change (delta a*, delta b* = +0.06, +0.26) during 500 hours of damp heat exposure (85%RH, 85ºC)
- Coated PET showed a reduced haze (ca. 0.75% decrease) compared to the (uncoated) PET control during damp heat testing
- Excellent adhesion (5B rating, ASTM D3359) after 500 hours in damp heat
- Minimal color change (delta a*, delta b* = +0.13, -0.34) during 500 hours in weatherometer (65ºC, 1 sun, Xenon Arc)
- Coated PET showed significantly reduced haze (~1.5% reduction) compared to the (uncoated) PET control during weatherometer testing
- Excellent adhesion (5B rating, ASTM D3359) after 500 hours in weatherometer
- Coated PET showed an increase in transmission (0.4 to 1.2%) when compared to the (uncoated) PET control
- Capability to be applied by both flow coating and solution casting
- A minimum 6 month coating solution shelf life
- Scratch hardness values [per ASTM D3363] between 2H and 3H

Additional in house testing of these coatings has demonstrated the following properties:

- Protect Polycarbonate substrates with a range of properties similar to PET
- Protects 6061 aluminum, steel, and copper from corrosion in a salt spray environment for periods in excess of 300 hours (per ASTM B117)
- Abrasion resistance is greater than 100 L/mil (ASTM D968, falling sand)
- Low VOCs, less than < 250 g/L (mainly alcohols)
- 5B rating on adhesion (ASTM D3359) after exposure to liquid N_2