

Title: Improved Wetting Properties

Technology: Protein-cyanoacrylate nanoparticles that improve the wetting property of materials

Rationale:

Rain decreases visibility in ways that cannot always be addressed by wiping it away – for example, the decrease in side and rear vision when driving a car. Additionally, the process of wetting and drying experienced by external devices, i.e. a solar cell, leads to the accumulation of dust, dirt and stains on the device. This technology provides a means of improving visibility and contributes to the effective functioning of equipment that may otherwise be deteriorated by the decreased transmission of light. This technology is very easy to apply: Simply spray on the surface of the material and rinse with water. The coating effect is instant and dramatic.

How it works:

Cyanoacrylate polymer is attached to protein (typically wheat protein) to form a diplock copolymer that behaves similar to soap molecules. The produced polymers form nanoparticles in the solution. Once this nanoparticle suspension is sprayed on the surface of a material and rinsed with water, the nanoparticles change their conformation. This allows the nanoparticles to be attached on the surface of the material and expose the protein molecules to the air. As a result, the surface of the material becomes hydrophilic (water loving) and its wetting property improves instantly and dramatically.

The use of hydrophilic coatings is not new, however, existing methods employ materials that use harmful chemicals and solvents. The only solvent used for this product is aqueous ethanol. The nanoparticles are made of protein and polycyanoacrylate, a degradable material used as a chemical for closing wounds on the battlefield during WWII. Therefore, the final product is degradable and non-toxic.

Examples of application:

- 1) Window glasses of houses and tall buildings
- 2) Windows glasses of automobiles, ships, and aircrafts
- 3) Side mirrors of automobiles
- 4) Swimming goggles and scuba masks
- 5) Surface of solar cell - Rain won't leave stains.
- 6) Green house/vinyl house – free of water droplets, improves sunlight transmission

IP status: Patent application was filed on 2/15/2013 (Docket #: 0131.11).

Private sector interest to date:

- 1) Singapore company, Hughco group – MTA was filed
- 2) American company, Meguiar's Inc. – denied signing MTA
- 3) Russian company, Ultra-Ever Dry – in the process of filing MTA
- 4) American company, (BRDC/Dow)