Permanent Anti-fog Coatings from Molecularly Blended Hydrophilic Polymers
Technology #13561

Applications

This technology has applications in cases where anti-fog performance is required on various transparent or reflective surfaces, such as:

- Optical instruments (e.g., cameras, microscopes, endoscopic instruments)
- Eyewear (e.g., safety goggles, face shields)
- Display screens (e.g., computer monitors, mobile device displays)
- Windows

Problem Addressed

Fogging by moisture condensation affects many optical surfaces, such as eyeglasses and vehicle windshields, often resulting in serious hazards. This technology addresses the need for effective and durable anti-fog coatings that are compatible with a wide range of substrate materials and geometries with minimal modification to manufacturing conditions.

Technology

This technology comprises a class of durable anti-fog coatings made up of molecularly blended layers of complementary hydrophilic polymers. Thin films of these complementary polymers are alternately deposited in a layer-by-layer protocol compatible with dip, spin, or spray coating processes. The complementary polymers undergo molecular blending at layer interfaces, producing a multilayered anti-fog coating. The water-based assembly process is compatible with a wide range of substrate materials and will conform to many geometries, including parts with complex topologies. Anti-fog coatings resulting from this process exhibit good surface hardness and abrasion resistance, which can be further enhanced by inducing covalent cross-linking between layers and at the substrate-coating interface.

Advantages

- Exceptional transparency and low haze
- Compatibility with existing dip, spin, or spray coating processes
- Compatibility with wide range of substrate materials and conformity to many geometries
- High surface hardness and abrasion resistance with potential for further enhancement through cross-linking treatment
- Excellent anti-fog performance under a variety of conditions

Intellectual Property

IP Type: Granted US Patent
IP Title: Coatings
IP Number: 8,986,848

**Categories For This Invention:**

- Materials
- Hydrophobic/Hydrophilic
- Thin Films
- Transportation
- Other (Transportation)

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**Publications:**

Durable Antifog Films from Layer-by-Layer Molecularly Blended Hydrophilic Polysaccharides  
Langmuir  
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**External Links:**

- Cohen Group: http://cohengroup.mit.edu  
- Rubner Group: http://web.mit.edu/dmse/rubner/

**Image Gallery:**