Non-Confidential Description

Unique Coatings with Phase Separation Properties for Use as Foul Release and Anti-Graffiti Paints

Technology Case: RFT-158

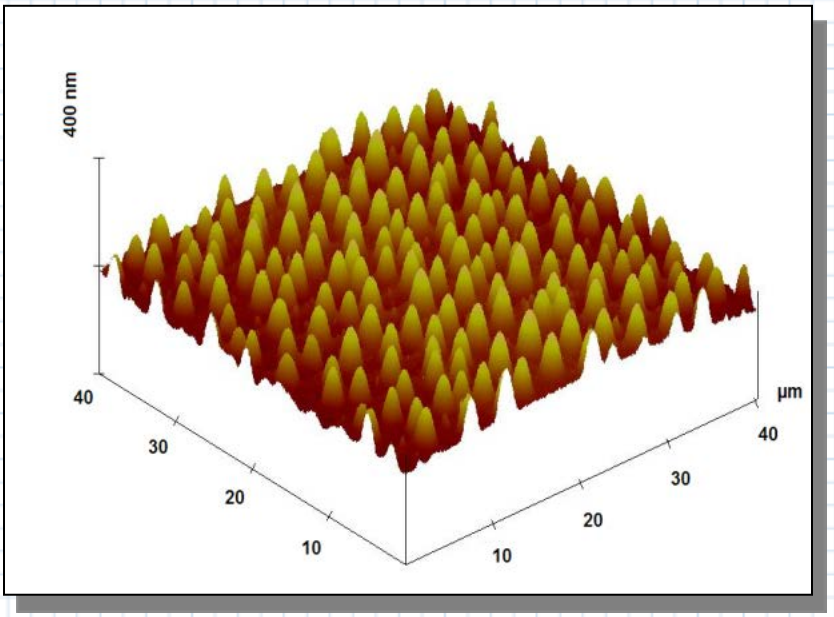

Figure 1: *Atomic force microscopy image of topographical coating surface*

Invention Summary

Scientists at North Dakota State University have created several novel coating compositions that spontaneously phase separate to form uniform micro-domains on the coating surface. This provides a multiphase topographical structure with a textured surface that inhibits adhesion, making it an ideal basis for fouling release and anti-graffiti paints and coatings.

Benefits

The micro-domain projections have low adhesion properties which are further augmented by the surface texture that limits the effective surface area for adhesion. Properties include:

- **Ideal for Anti-Graffiti Coatings**: Ideally suited for use in anti-graffiti coatings or on release paper for adhesive labels.
- **Uniform Surface Structure:** Textured surface develops with a predictable formation and design.
- **Stabile Composition:** Durable under a variety of environmental conditions, including soaking in water for extended periods of time.
- **Minimizes Adhesion by External Material:** Coating texture limits contact points with any material applied, while contact surfaces also discourage adhesion.
- **Fouling Release Coatings:** Reduced adhesion and surface texture deters the settlement and growth of organisms such as barnacles.

Invention Premise

This invention involves a unique siloxane-urethane composition that results in a spontaneous formation of a stable micro-topographical surface structure. Design conditions cause the siloxane-rich domains to phase-separate during the film formation process, restricting their ability to fully cover the surface of the coating. This system generates stable

microstructured surfaces without using multi-step templating and molding methods traditionally used to produce surface topographical features. The microstructured coating can also be prepared and applied over a large area, inhibiting the adhesion of organisms or other substances to large surfaces. Micro-domain projections extrude approximately five microns from the surface with a separation distance of five microns between projections.

Patents

This technology has an issued US Patent No. 8,062,729 and is patent pending with fully preserved patent rights in Europe and Japan. It is currently available for licensing/partnering opportunities.

The Lead Inventor

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Dr. Webster worked for Sherwin-Williams Company where he was involved in resin development for industrial coatings as well as long-range research in new resins and crosslinking chemistry. While in Chicago, he helped develop the Coatings Technology program at DePaul University and taught a course in coatings resin technology. In 1993, he moved to Eastman Chemical Company where he led project teams in the areas of applications development for new monomers, new chemistry for coatings systems, and polymer development for coatings. He joined the Coatings and Polymeric Materials Department at NDSU in the fall of 2001.

Center for Nanoscale Science and Engineering (CNSE)

The disclosed compositions were developed by researchers at NDSU's Center for Nanoscale Science and Engineering (CNSE). CNSE conducts large-scale, multidisciplinary research for government and industry. Located in a state-of-the-art research facility in the NDSU Research & Technology Park, CNSE's facility includes 77,000 square feet of cleanroom, laboratory, and engineering spaces and has design, synthesis, fabrication, and characterization capabilities. Core competencies include wireless miniaturized electronics design, prototype fabrication, research on polymeric and hard protective coatings, and materials for electronics and energy conversion.

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