Robust Hydrophobic Thin Films Development

ID: 2012-033

Executive Statement:

A new method for creating durable, hydrophobic thin films with broad applications in nano and bioengineering.

Technology Overview:

The technology involves a novel process for producing hydrophobic thin films through layer-by-layer deposition of poly(allylamine hydrochloride) and poly(acrylic acid) on silicon substrates, followed by a high-temperature cross-linking to form amide bonds. This method leverages polyelectrolytes and thiol-ene chemistry, with enhancements in hydrophobic properties achieved through fluorinated thiols.

Key Advantages:

- Enhanced mechanical and chemical stability of the films
- Improved hydrophobicity through fluorinated thiols and further chemical modifications
- High efficiency of cross-linking at elevated temperatures
- Flexibility in modifying surface properties for specific applications

Problems Addressed:

- Difficulty in producing hydrophobic surfaces with long-term stability
- Limited methods for fine-tuning the surface properties of thin films for specific applications
- Challenges in achieving high-efficiency cross-linking in thin film production

Market Applications:

- Development of surfaces with tailored hydrophobic, oleophobic, and biocompatible characteristics
- Applications in nanoengineering for the creation of stable nano-coatings
- Potential bioengineering applications, including biocompatible surfaces for medical implants