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Intellectual Property Status:

Patent Pending

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Chlorine Resistant Permeable-Impermeable Nanocomposite (PINC) Membranes for Osmotic Separations

AzTE Case # M12-037P

Background

Water is crucial for human survival. Water is also a pivotal aspect of the global economy for its uses in agricultural irrigation, industrial processes, electricity production, and as drinking water. Continuous population growth limits the supply of freshwater. Because water conservation alone cannot resolve the problems of the shrinking water supply, production of fresh water from alternative sources such as reclaimed wastewater, brackish groundwater, and ocean water is imperative. Currently, osmotic processes are able to produce high quality water from these sources. However, with long-term use, osmotic membranes interact with biological material causing reduced overall performance and increased operating costs. In particular, osmotic membranes are vulnerable to degradation by chlorine exposure.

Invention Description

Researchers at Arizona State University are developing a new type of osmotic membrane that resists degradation by chlorine. The membrane is composed of selectively permeable inorganic nanoparticles connected by a dense chlorine tolerant polymeric thin film.

Potential Applications

- Desalination Plants
- Wastewater Treatment Plants
- Home-use Systems

Benefits and Advantages

- **Reduce Pre-treatment Costs:** Because the membrane is chlorine resistant, there is no need for expensive pre-treatment processes such as de-chlorination.
- **Extended Lifetime:** Because the membranes will not be degraded by chlorine, it will last more than twice as long.
- **Mechanical Strength & Flexibility:** The polymeric thin film used has strong mechanical strength and flexibility.