

Solution Grade Polymers for Complex Medical Devices

Design Challenges Deserve Lubrizol's Innovative Solutions

Design and fabrication of medical devices from polymers often involves a melt process such as extrusion and reflow of catheter tubing, injection molding of connectors or thermal forming of thin walled balloons. In some cases, thermal methods do not allow for the manufacturing of critical device features. When this happens, solution based processing can allow specific designs and geometries that enable high-level performance.

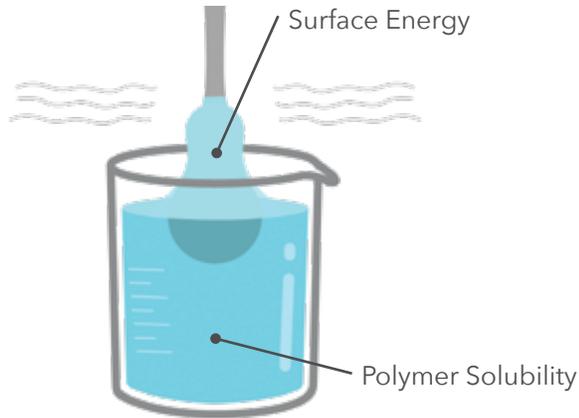
Thermoplastic polyurethanes (TPU) are well suited for these methods due to their solubility and highly tunable range of physical, chemical and biological properties. The Health team at Lubrizol Life Science (LLS Health) offers several TPUs designed for solution processability, such as Tecoflex™ SG, 1-MP and Tecophilic™ SP series products. However, many solution processes require highly customized materials for optimal performance. As your development partner, LLS Health has the expertise to create application-specific solution processable polymers to enable your next generation of innovative medical devices.

Solution based processing methods can enable unique features such as:

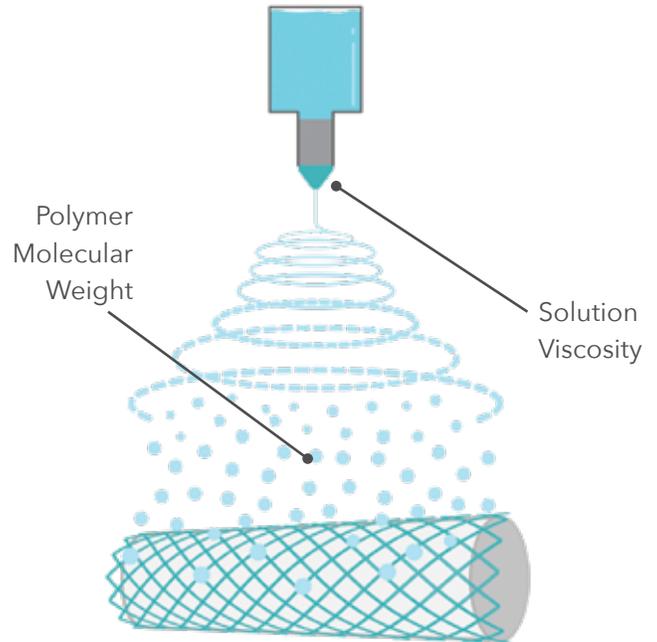
- Thin or fine structures
- Semi-permeable membranes
- Unique geometries
- Delicate or heat sensitive components
- Coatings
- Fibers
- Foams
- Adhesion promotion

Solution Grade Polymers for Complex Medical Devices - Common solution methods include dip casting, film casting, electrospinning, spraying, chemical vapor deposition and others. LLS Health understands the unique requirements and factors that must be considered for a robust, successful solution process.

Solution Dip Casting

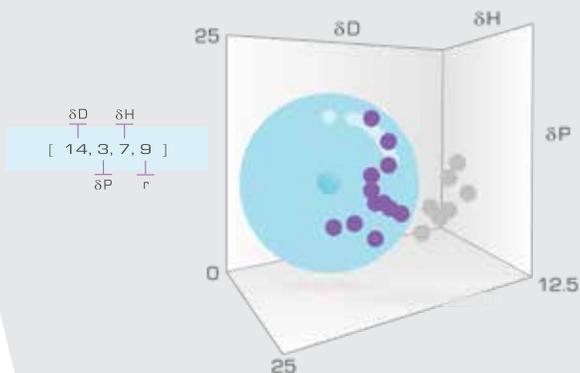


Electrospinning/Solution Spraying



Designing for Solubility: Hansen Parameters

Solubility of a polymer in a solution system greatly influences its ability to be processed via a solution method. Modeling tools such as Hansen solubility parameters can provide insight to guide and accelerate material and process development.



Your Design, Our Science, Exceptional Performance

From tailored synthesis, to analytical services and application development, we have expertise and resources to extend the capabilities of your own design and development teams. Design parameters for solution systems include:

- Solubility
- Rheology
- Solution viscosity
- Molecular weight
- Surface energy
- Surface roughness
- Adhesion
- Transmission & barrier properties
- Physical characterization
- Prototype development