High Strength Polyisobutylene Polyurethanes

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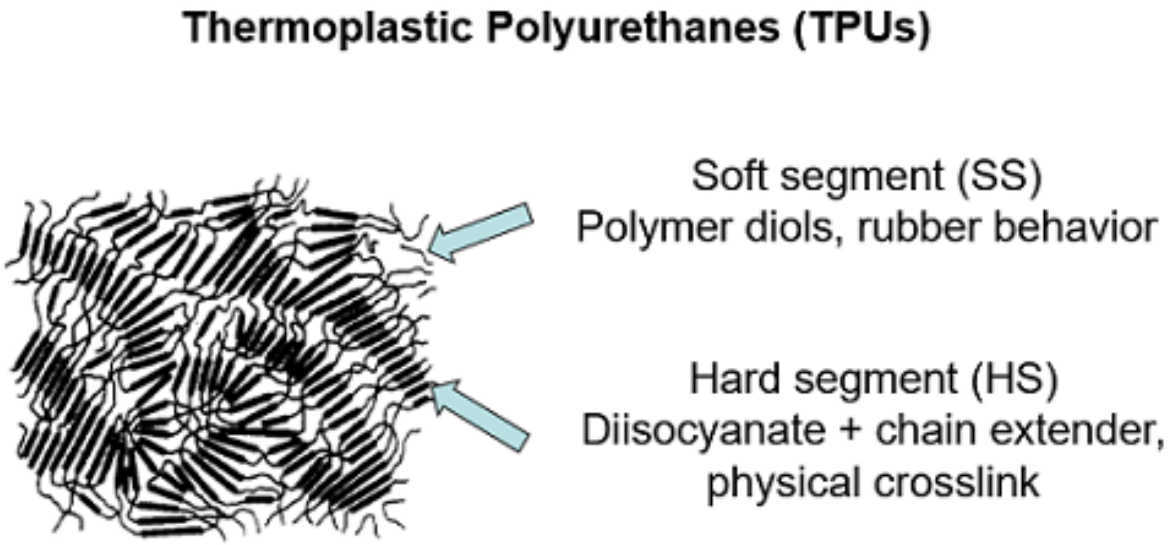
Technology description

Background

Polyurethanes represent an important group of thermoplastic elastomers. They can be extruded, injected, compression molded, or solution spun into many different devices. In their use, Polyurethanes offer great physical properties, including high tensile and tear strength, chemical and abrasion resistance, good processability, and protective barrier properties. With their high durability, Polyurethanes are largely used in the Medical field for many different surgical devices, hospital equipment, and other applications.



Koberstein, J. T., Russell, T. P. *Macromolecules* **1986,** *19*, 714

Polyurethanes are comprised of; a hard segment made up of a combination of diols and diamines, and a lightweight soft segment filled with polymeric diols.

Limitations of Conventional TPUs : Polyether or polyester based TPUs suffer fromin vivooxidative degradation, which reduces the lifetime and mechanical strength and thus limits the use as the materials for biomedical devices.

Polyisobutylene (PIB) based Polyurethanes offer high stability, but have poor mechanical properties without the addition of one of these diols.

Technology

Professor Rudolf Faust has been able to develop high-mechanical strength and biostable PIB-based TPUs by altering the catalyst concentration. His work in the published paper has shown that lowering the catalyst concentration significantly improves the mechanical properties.
The new methods of synthesizing Polyurethanes creates a mechanically strong material that can maintain its strength throughout long term use.

Market Potential

From 2017 to 2022, the global Medical Device market is projected to rise from $521.2 Billion to $674.5 Billion at a CAGR of 5.3%.

Publications

https://patents.google.com/patent/WO2014081916A2/en

Application area

· Biomedical devices
Pacemakers
Defibrillators
Surgical drains
Dialysis devices

Advantages

· Increased bio-stability
· Safe for long term medical use
· Improved tensile strength
· Improved mechanical properties

Institution

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