

Cardiovascular Biomaterials and Polyurethanes: Issues and Perspectives

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Over the past four decades, thermoplastic elastomeric polyurethanes have received increasing attention for their potential use in cardiovascular devices based on their excellent structure/property relationships. These four decades have seen the evolution of segmented polyurethanes move from soft segments composed of polyesters to polyethers to polycarbonates and chemically mixed soft segments, all intended to address the significant issue of biodegradation. This presentation focuses on presenting the strengths and weaknesses of each general type of polyurethane with attention to the strengths and weaknesses of the soft segment incorporated into the macromolecular structure.

While the emphasis in this presentation will be on cardiovascular applications, other applications of polyurethanes provide insight and perspective into the in vivo behavior of polyurethanes and their respective impact on biological responses. Selected examples, drawn from the literature, will be utilized to identify issues remaining with polyurethane cardiovascular implants. Future needs and challenges in the design and development of polyurethanes will be presented.