

Photopolymerization-Based 3D Printing for Medical Device Applications

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Abstract

In this talk, I will describe recent advances in photopolymerization-based 3D printing technologies to process microstructured and nanostructured materials for medical applications. For example, an additive manufacturing approach known as two photon polymerization has been used for selective polymerization of photosensitive resins. Polymerization of structures with microscale and nanoscale features is achievable since multiphoton absorption exhibits a nonlinear relationship with the incident light intensity. We have used two photon polymerization used to create several types of medically-relevant structures with microscale and nanoscale features out of photosensitive polymers and organically-modified ceramic materials. Materials testing and application-specific device testing, including *in vivo* studies, will be considered.

Biography

Dr. Roger Narayan is a Professor in the Joint Department of Biomedical Engineering at the University of North Carolina and North Carolina State University. He is an author of over two hundred publications as well as several book chapters on processing and characterization of biomedical materials. Dr. Narayan has also edited several books, such as the textbook *Biomedical Materials* (Springer) and the handbook *Materials for Medical Devices* (ASM International). Dr. Narayan has received many honors for his research activities, such as the NCSU Alcoa Foundation Engineering Research Achievement Award, the NCSU Sigma Xi Faculty Research Award, the University of North Carolina Jefferson-Pilot Fellowship in Academic Medicine, the University of North Carolina Junior Faculty Development Award, the National Science Faculty Early Career Development Award, the Office of Naval Research Young Investigator Award, and the American Ceramic Society Richard M. Fulrath Award. Dr. Narayan has been elected as Fellow of the American Ceramic Society, AAAS, ASM International, and AIMBE

