3D Filament Printing of Thermoreversible Thermoset Filaments With a Delayed Cure

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Invention:
Filaments made of a thermoreversible thermoset based on Diels Alder cycloadducts are used in 3D filament printing to create 3D artifacts that will irreversibly cure via reaction of reactive diene or dienophile components. This allows filaments to be made and a thermoset to be formed in the final printing.

Applications:
• 3D Printing, prototyping, custom manufacturing, wide variety of industries.
• 3D Printing allows for quick and inexpensive production of custom structures
• Melt-processable thermoplastics have inferior properties to thermosets
• 3D Printable thermosets expand the range of useful objects that can be made

Advantages:
• Thermoset materials are stronger and more robust than thermoplastics
• More uniform curing possible with thermal cure instead of photo cure
• New material could be used as a spooled filament feedstock instead of tanks of messy liquid precursor.
• Possibly less prepolymer waste

Licensing Manager:

Contact Robert Sleeper
Licensing Manager
roberts@tla.arizona.edu
(520) 626-4604

The University of Arizona, Tucson, Arizona
Robert Sleeper
email@tla.arizona.edu
520-626-4604

Inventors

Barrett Potter, Jr.
Professor, Materials Science & Engineering

Krishna Muralidharan
Associate Professor, Materials Science & Engineering

Douglas Loy
Professor, 20 Materials Science & Engineering