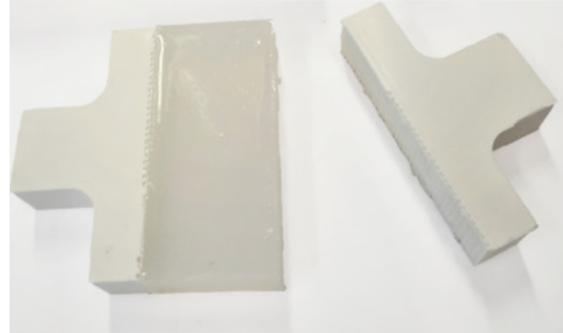


Active Disassembly for 3D Printing



3D printed bike handle with a hard and soft component



Hard and soft regions separated at interface

Background

Many products around us benefit from having combinations of different materials with different properties. These include products that have hard and soft material combined, such as bike handles, chairs, helmets. An increasing number of 3D printers is capable of fabricating such products, as multi-material printing is becoming widespread. Multi-extrusion fused deposition modeling (FDM) machines, such as the Ultimaker S3 and S5, enable fabrication of products with multiple (at least two) different materials.

Such printers provide the opportunity to fabricate products with increasing functionality without complicating assembly. However, this technology also poses challenges for the end-of-life of products. When different plastics are completely fused into one product, it becomes very difficult, or impossible to separate the materials for reuse or recycling.

Addressing this problem, one direction we intend to explore is Active Disassembly [1]. Active Disassembly is the principle of disassembling products into separate components using smart materials. For example, using fasteners that deform in warm water and therefore release the connection between two components. Active Disassembly is generally focused on traditional manufacturing and it is still unknown how it can be applied in 3D printed multi-material structures.

Your assignment

Your assignment is to develop a 3D printed material interface that joins two printed materials together. During the use of the product, the interface should remain intact. At the end of life of the product, the interface should be able to release and separate the materials. Your activities will include designing and testing different 3D printed structures, exploring different modes of activation and coming up with applications for the technology.

Interested? Let us know!

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[1] J. Chiodo and N. Jones, "Smart materials use in active disassembly," *Assem. Autom.*, vol. 32, no. 1, pp. 8–24, 2012.