# DEBONDING ON DEMAND FOR 3D PRINTED PARTS

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Crosslinked polymers are well known for their good mechanical properties and resistance against heat, moisture, and chemicals. Thus, these polymers are desired products in industry and economy. Above all, their capability to undergo cationic polymerization makes them a suitable candidate for 3D printing. This already widely acclaimed research field gains much importance due to its easier and cheaper accessibility for the market in the last decades. [1]

However, crosslinked polymers cannot be recycled, and incorporated components cannot be reutilized. Due to the polymer's glassy nature, adhesive properties and thermal stability, it is not possible to regain embedded parts, such as electronic devices or rare earth elements, out of these polymers.

Debonding on Demand (DoD) offers a new way to overcome this drawback by integrating labile crosslinkers into the network, which can be degraded by an external stimulus, such as heat. Through this stimulus, it is possible to debond the crosslinked network at suitable temperatures to rescue valuable components from the polymer matrix.

Therefore, we synthesized a cationically curable and thermally cleavable photopolymer network. Thus, formulations with different reactive diluents have been investigated. Furthermore, the synthesized polymers where then tested with respect to their (photo)chemical and (thermo) mechanical behavior. To test the crosslinker's ability for DoD, debonding experiments have been performed compared to commercially available non-labile crosslinker systems.

[1] Ligon, S. C.; Liska, R.; Stampfl, J.; Gurr, M.; Mulhaupt, R., Polymers for 3D Printing and Customized Additive Manufacturing. *Chem Rev* **2017,** *117* (15), 10212-10290.