# 3D printed microstructures via photo-controlled polymerization

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Recently, photo-controlled reversible addition-fragmentation chain transfer (RAFT) polymerization has been successfully applied in digital light processing 3D printing.[1-2] It provides a convenient way to tune the surface properties of the 3D printed object. However, so far, 3D microstructures and their surface's reconfiguration based on photo-controlled polymerization have been scarcely investigated.[3-4] In these works, photocontrolled RAFT polymerization and nitroxide mediated photopolymerization have been used successfully to produce 3D micro-objects with living properties. In particular, one macro-photoiniferter, synthesized by photocontrolled RAFT polymerization, is applied to 3D direct laser writing. Thanks to the exquisite spatial control of the photoreaction, 3D microstructures with feature sizes of around 500 nm are successfully obtained. Taking advantage of the presence of dormant polymeric RAFT agents, photo-induced post-modification of the printed microstructures is highlighted via the elaboration of multi-chemistry patterns including thermo-responsive ones. [3] These results open new perspectives in multi-material and 4D micro-printing.

[1] Zhang et al. Angewandte Chemie Intern. Ed. **2019**, *58* (50), 17954-17963

[2] Lee et al. Angewandte Chemie Intern. Ed. **2021**, *60* (16), 8839-8850

[3] Wu et al. Adv.Funct.Mater. **2022**, *32* (14), 2109446

[4] Belqat et al. Adv.Funct.Mater. **2023**, *just accepted,* https://doi.org/10.1002/adfm.202211971