

Two photon polymerization for micrometric devices fabrication

Two-photon polymerization (TPP) is an advanced fabrication technique that enables the high-resolution 3D printing of micro- and nanoscale structures with feature sizes reaching down to 500 nm. This process is based on the exploitation of a tightly focused femtosecond laser beam that triggers localized polymerization of a photosensitive resin through the simultaneous absorption of two photons. This mechanism allows precise polymerization control over structure geometry without the need for additional lithographic steps. Recent advancements in materials, from hybrid polymers to nanocomposites and hydrogels, have further expanded the versatility of this method. This presentation provides an overview of TPP fundamentals, fabrication setups, and state-of-the-art applications, highlighting its potential for next-generation micro- and nano-fabrication technologies.