

SUSTAINABLE PHOTOCURABLE RESINS FOR 3D PRINTING

[Saeed Beigiboroujeni](#)¹

¹Monterrey Institute of Technology, Sience, Mexico.

Sustainable 3D-printable photocurable resins are innovative materials for additive manufacturing that combine high performance with environmental responsibility. Unlike conventional resins derived from fossil fuels, these eco-friendly alternatives include bio-based and engineering-grade resins, all designed to minimize waste and reduce the carbon footprint of 3D printing.

In this talk, I will present two complementary strategies for designing green resins. The first involves a polyvinyl alcohol-based resin functionalized with methacrylated vanillin, introducing renewable aromatic moieties while maintaining photocurability. The second uses CO₂ as a green carbon feedstock to synthesize cyclic carbonates, which are further converted into functional monomers. Both approaches demonstrate the potential of renewable and CO₂-derived chemicals to produce high-performance, sustainable resins for additive manufacturing, highlighting how innovative chemistry can advance eco-friendly materials and circular manufacturing technologies.

Keywords: Sustainable 3D printing, photocurable resins, CO₂-derived monomers

Presenting author's email: saeed.beigi@tec.mx