Additive Manufacturing of High-Refractive-Index, Nanoarchitected Titanium Dioxide for 3D Dielectric Photonic Crystals


Scientific Achievement

- Developed an additive manufacturing (AM) process for titanium dioxide (titania, TiO₂) with ~100 nm resolution

Significance and Impact

- AM of 3D nanoarchitected titania will enable facile fabrication of components for micro-optics, 3D MEMS, minimally invasive tools and procedures, and photocatalysis

Technical Details

- 120-600 nm features with <1% porosity
- Rutile phase of nanocrystalline TiO₂ w/ 120nm grain size
- Process precision allowed to fabricate 3D dielectric photonic crystals with full photonic bandgap in the infrared

Reprinted with permission from ACS Nano Letters: DOI:10.1021/acs.nanolett.0c00454
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