Insights into Preceramic Polymer-Based Inks for 3D Printing

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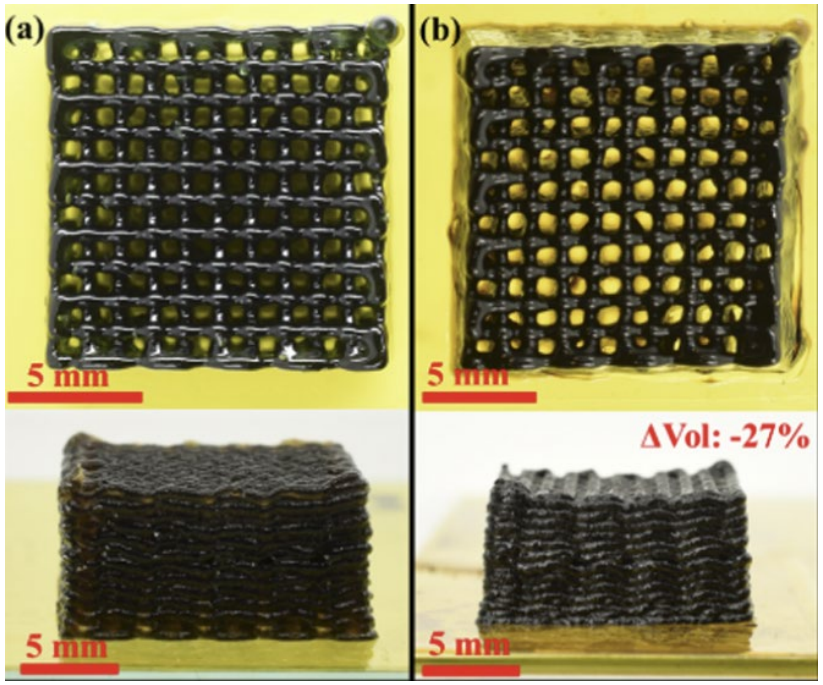
CHX



Images of (a) the top and side view of a sample printed using a PCP/PCPGNP mixture and (b) the same sample, thermally-treated.

G. Germanton, K. L. Martin, M. A. Hossain, N. D. Posey, J. F. Ponder Jr., C. Ramirez, P. Gnanasekar, L. Wiegart, P. Polisetty, D. T. Hallinan Jr., M. B. Dickerson, S. Ramakrishnan. *ACS Appl. Eng. Mater.* 2024, 2, 10, 2379–2390.

Work was performed in part at NSLS-II

National Synchrotron Light Source II

Scientific Achievement

A commercial preceramic polymer (PCP) dispersed with PCP-grafted nanoparticles (PCPGNPs) was shown to have more desirable properties than PCPs alone.

Significance and Impact

PCP/PCPGNP mixtures are an underexplored, promising route to better feedstocks for 3D printing, and ultimately the creation of better 3D-printed products.

Research Details

- Researchers investigated PCP/PCPGNP systems by combining rheology with X-ray measurements at the CHX beamline at NSLS-II to obtain holistic insights into how the materials deform, flow, and solidify on macroscopic and microscopic length scales.
- Samples exhibited desirable traits, including higher viscosities and better shape retention.

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