# Novel Inks for Direct Writing in Three Dimensions

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## Abstract

*Direct-write assembly of 3-D periodic structures requires control over, and, hence, a fundamental understanding of their phase behavior, structure, and rheology of concentrated inks. This talk will feature examples from our recent efforts in engineering novel inks from colloidal, nanoparticle, and polyelectrolyte building blocks. First, the design of concentrated nanoparticle inks with viscoelastic properties suitable for writing 3-D periodic structures with minimum feature sizes as low as 10 μm is described. Second, a new ink design based on concentrated polyelectrolyte complexes is highlighted that enables the fabrication of 3-D micro-periodic structures with submicron features. The myriad of 3-D inks and assembly routes under development offers the potential to architect complex structures required for structural and functional composites, tissue engineering scaffolds, microfluidic networks, as well as photonic band gap materials.*

## Author Biography

*Jennifer A. Lewis is the Hans Thurnaeur Professor of Materials Science and Engineering at the University of Illinois. She has received numerous awards including the NSF Presidential Faculty Fellow Award (1994) and Fellow of the American Ceramic Society (2005). Her research on novel inks for 3-D direct writing has been cited as a top achievement in C&E News (2002) and as an nanoscience image of the year in Science & Vie (2004), in their year-in-review issues.*