OAK RIDGE NATIONAL LABORATORY
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3D Photonic Structures from Actively Assembled Polymer-Blend Microspheres

Disclosure Number

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Technology Summary

The subject invention disclosed herein is the formation of stable three-dimensional structures that are “grown” from sequential attachment of spherical polymer-blend microparticles. The three-dimensional linear or branched chains of polymer-blend microspheres are generated from liquid droplets of solution where the modified surface structure of the polymer composite results in highly robust interparticle bonds. This approach allows for precise and programmable architectures whose properties can be controlled by properties of the individual polymer-blend microparticles (“monomer” elements) such as size, charge-state, and position. The robust interlocking nature of interparticle linkage gives rise to strongly coupled morphology-dependent resonances in bisphere and trisphere systems, suggesting the possibility of three-dimensional photonic “molecules” and microscale optical manipulation applications.

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