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Polymeric nanocomposite comprising size-controlled organic nanostructures via copolymer-directed self-assembly DEQUAN XIAO[1], KUNHUA LIN, Department of Chemistry, Sichuan University, Chengdu, 610064 China, QIANG FU, Department of Polymer Science and Engineering, Sichuan University, State Key Laboratory of Polymer Materials Engineering, Chengdu, 610065 China, QINJIAN YIN, Department of Chemistry, Sichuan University, Chengdu, 610064 China — Inspired by inorganic nanomaterials, low-dimensional organic nanostructures have emerged as a new field of nanomaterials with the presence of size-dependent physical properties. Here, we report a polymeric nanocomposite comprising size-controlled organic nanostructures, formed by copolymer-directed self-assembly. By TEM and SEM images, we found the near-spherical shapes of the zero-dimensional organic nanoparticles. A strongly broadened Raman shift band was probed, suggesting the presence of size-dependent quantum confinement effect. By proof-of-principle quantum chemical calculations, we further explain that the strong Raman broadening is caused by the heterogeneous size-distribution of the organic nanoparticles. The present polymeric nanocomposite opens a new route for exploring low-dimensional organic nanostructures with size-dependent physical properties.

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