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Polymer Blend Emulsions Stabilized by Janus Particles KYLE BRYSON, THOMAS RUSSELL, RYAN HAYWARD, University of Massachusetts - Amherst — Kinetic trapping of bicontinuous polymer morphologies through the interfacial segregation of nanoparticles is of interest due to the unique combination of the properties of each component provided by such structures, and their potential for use as membranes and composite materials. However, this strategy is challenging to realize in polymeric systems, due to the difficulties in preparing particles that are neutrally wetted by the two polymer phases. Janus particles afford a route to circumvent the necessity of neutral wettability. In addition, both theory and experiment have shown enhanced interfacial adsorption energies for Janus particles, as well as greater flexibility in controlling particle orientation at the interface, in comparison to homogeneous particles. Dumbbell-shaped gold-silica Janus particles were synthesized using several sizes of gold seeds. These particles were made amphiphilic by functionalization with both polymeric and small molecule silanes and thiols. Their interfacial activity was measured using pendant drop tensiometry, and their ability to stabilize bicontinuous emulsions of polymers was examined by TEM. The results elucidate the role of particle wettability on interfacial behavior and the structure of stabilized emulsions.

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