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Self-Assembled Soft Porous Particles with Tailored Nano-Porosity. KANG HEE KU, JAEMAN SHIN, KAIST, DANIEL KLINGER, U.C. Santa Barbara, RYAN C. HAYWARD, University of Massachusetts, SE GYU JANG, KIST, CRAIG J. HAWKER, U.C. Santa Barbara, BUMJOON J. KIM, KAIST — A series of porous block copolymer (BCP) particles with controlled porosity and nanostructure was fabricated by tuning interfacial hydrodynamics of toluene-in-water emulsion droplets. A synergistic adsorption of polystyrene-b-poly(4-vinylpyridine) (PS-b-P4VP) BCPs and sodium dodecyl sulfate (SDS) to the surface of emulsion particle induced a dramatic decrease in the interfacial tension and generated the interfacial instability at the particle surface, thus producing different types of particles including closed pore particles, open pore particles, capsules and micelles. In particular, the SDS concentration and the P4VP volume fraction of PS-b-P4VP were key parameters in determining the degree of interfacial instability of the emulsion, producing porous particles with tunable pore sizes ranging from 10 to 500 nm. These porous particles could be used as pH responsive carriers, which were demonstrated by combining and releasing of different colored dyes to particles at desired pH conditions.

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