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Flash NanoPrecipitation as a scalable platform for the production of structured and hybrid nanocolloids VICTORIA LEE, CHRIS SOSA, Princeton University, RUI LIU, Tongji University, ROBERT PRUD'HOMME, RODNEY PRIESTLEY, Princeton University — Geometrically-structured polymer nanocolloids have been widely investigated for their unique properties, which are derived from their anisotropy. Decoration with inorganic nanoparticles in a controlled manner could induce another level of functionality into structured nanocolloids that could enable applications in fields such as re-writeable electronics and biphasic catalysis. Here, Flash NanoPrecipitation (FNP) is demonstrated as a one-step and scalable process platform to manufacture hybrid polymer-inorganic nanocolloids in which one phase is selectively decorated with a metal nanocatalyst by tuning the interactions between the feed ingredients. For instance, by modifying polymer end-group functionality, we are able to tune the location of the metal nanocatalyst, including placement at the Janus nanocolloid circumference. Moreover, the addition of surfactant to the system is shown to transform the Janus nanocolloid structure from spherical to dumbbell or snowman while still maintaining control over nanocatalyst location. Considering the flexibility and continuous nature of the FNP process, it offers an industrial-scale platform for manufacturing of nanomaterials that are anticipated to impact many technologies.

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