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Designing active microcapsules to capture nanoparticles dispersed in fluid[1] ALEXANDER ALEXEEV, SVETOSLAV NIKOLOV, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology — Tactfully utilizing the large volume change associated with the volume-phase transition of hydrogels enables design on new microscopic system and devices with biomimetic functions. We use mesoscale computational modeling to design an active microcapsule capable of selectively capturing nanoparticles which are dispersed throughout the solvent. The microcapsule is comprised of a rigid spherical shell with six perforated holes and a stimuli-sensitive gel, which is placed inside the spherical shell. Upon application of an external stimulus the gel swells, expanding through the perforated holes in the shell and making contact with the nearby solvent and nanoparticle mixture. When the external stimulus is removed the gel collapses and returns into the microcapsule interior, bringing in nanoparticles, from the outside, in the process. Functionalizing the microcapsule with a polymer brush prevents nanoparticles from randomly diffusing into the microcapsule which gives us the ability to precisely control the nanoparticle concentration within the microcapsule interior.

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