Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Patchy Particles of Block Copolymers from Interface-Engineered Emulsions KANG HEE KU, YONGJOO KIM, KAIST, GI-RA YI, Sungkyunkwan Univ., YEON SIK JUNG, BUMJOON KIM, KAIST — A simple method for creating soft patchy particles with a variety of three-dimensional shapes has been developed through the evaporation-induced assembly of polystyrene-b-poly(4-vinylpyridine) (PS-b-P4VP) block copolymer (BCP) in an oil-in-water emulsion. Depending on the particle volume, a series of patchy particles in the shapes of snowmen, dumbbells, triangles, tetrahedra, and raspberry can be prepared, which are then precisely tuned by modulating the interfacial interaction at the particle/water interface using a mixture of two different surfactants. Moreover, for a given interfacial interaction, the stretching penalty of the BCPs in the patchy particles can be systematically controlled by adding P4VP homopolymers, which decreases the number of patches of soft particles from multiple patches to a single patch but increases the size of the patch. Calculations based on the strong segregation theory supported the experimental observation of various soft patchy particles and identified the underlying principles of their formation with tunable 3D structures.

Kang Hee Ku
KAIST

Date submitted: 10 Nov 2016 Electronic form version 1.4