Colloidal patchy particles for colloidal self-replications

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We report here that colloidal patchy particles were prepared by the phase separation of decane-swollen particles and the evaporation of decane oil. Depending on the amount of decane captured in particles, dimple size was changed precisely. Curvature of dimple was increased when solvent is more hydrophobic. By removing excess amount of surfactant used for stabilizing swollen particles, hydrophobic dimple were produced when decane was evaporated. Then, dimple particles were formed into dumbbells spontaneously because of hydrophobic interaction between dimples. Furthermore, multiple protrusions of decanes were also formed, which were kinetically stable, and multiple patches were formed on the polymer particle surfaces which will be used for self-organized colloidal structures including strings or networks.