

## Fabrication of Binary Colloidal Clusters using Water-in-Oil emulsions

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The aggregates of small number of colloidal particles, colloidal clusters, have been studied by many research groups for understanding of nanoscopic matter as using atomic model and photonic materials such as ultrawhite pigments. Also, these small colloidal clusters offer the possibility of forming more complex colloidal phases and structures than can be realized using simple spheres. To form compact packing clusters, emulsion droplets are used as confined geometry and evaporation of emulsion induce the colloidal clusters. The configuration of clusters is unique for each number of particles when the number of particles is under 11. Recently, our groups reported that binary colloidal clusters have special features which induce a selective directional interaction required for constructing a large colloidal structure. In this study, we present binary colloidal aggregates by self-organization of bimodal particles confined in water droplets. By controlling of surface characteristics and interaction between particles, we could make binary colloidal clusters with various materials. Especially, shapes of clusters encapsulated with nanoparticles suggest new application field, "3-D colloidal transistors".