

The formation of microscale droplets covered by amphiphilic gold nanoparticles (AuNPs) with different hydrophobicity

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Amphiphilic gold nanoparticles (AuNPs) functionalized with mixed monolayers consisting of hydrophobic and hydrophilic ligands were synthesized at different molar ratios of ligands. The actual ratios of hydrophobic to hydrophilic ligands were obtained from electrostatic titrations by addition of charged surfactants to amphiphilic AuNPs. By using the AuNPs with different ratio of hydrophobic to hydrophilic ligands, the hexane microscale droplets in water were stabilized. The formation of the droplets was achieved by the interfacial assembly of the amphiphilic AuNPs at the hexane-water via arrangement of the ligands on the AuNP. More importantly, the maximum uptake and equilibrium constant of AuNPs at the hexane-water interface was obtained using the Langmuir isotherm equation. From the maximum uptake of AuNPs, we also estimated the closest distance between AuNPs at the interface.