Colloidal Surfactants

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Molecular surfactants are widely used in different fields mainly because of their amphiphilic property which makes them favorable to stay at the interface. Recently colloidal surfactants have drawn lots of attention due to the better stability and flexibility they can provide. But the mechanism about how these colloidal surfactants work is still unclear. To this end, we purposely made different kinds of colloidal dimers which can serve as colloidal surfactants. The dimers we have made can exhibit different surface functionality on two lobes. The most interesting dimers we made are temperature sensitive. This dimer has one hydrophobic lobe and the other one is temperature responsive which is hydrophilic at low temperature and become hydrophobic by raising the temperature. Therefore this dimer can go to the interface at low temperature and works like a surfactant, but when temperature goes down it will go to the oil phase. In that sense, we can control the location of these colloidal dimers, and also makes the surfactant removal much easier compared with the traditional ones. We can also make a regular hydrophobic-hydrophilic dimer, but the hydrophile-lipophile balance of the dimer particles can be tuned, for example, by changing the charge density on the hydrophilic lobe. By studying these colloidal dimers at the interface, we will also show our understanding about how the different surface properties would affect the colloidal surfactants’ behavior.