

### Stabilization of Water-In-Water Emulsions by polymer microspheres

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Water-in-Water Emulsions have been applied in a variety of filed, such as biomedical applications (Artificial cells and cyto-mimetic materials etc.), cosmetic products (Oil-free etc.), food, and performance products. Thus, the stabilization of Water-in-Water emulsion is the key issue for expanding their utilization. In this study, the effect of a surface modified polystyrene microsphere whose density is similar to that of water on the stability of Water-in-Water Emulsions was thoroughly studied. To do so, W/W emulsions have been produced using several different polystyrene microspheres, surface-modified with carboxylic group, sulfate group, and polyethylene glycol (PEG) group, respectively. In addition, silica particles of various sizes were used as controls. Here, dextran rich aqueous droplets are dispersed in a continuous PEG rich phase, and the coalescence of droplets can be inhibited by adsorbed polystyrene microspheres. These droplets were visualized using a confocal laser scanning microscopy (CLSM), and Using these polystyrene microspheres as the stabilizer, we successfully report that emulsions were survived without any significant change for at least several weeks.