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Surfactant Free Aqueous Emulsions JACOB URQUIDI, JOSHUA AMBURGEY, GREGGORY MCPHEARSON, New Mexico State University — The stabilization of hydrophobic colloids, such as oil droplets, in water has attracted scientist for a long time for a variety of scientific, pharmaceutical and industrial applications. Several studies have been done to understand the stability of oil-in-water emulsions. Pashley and coworkers have proven that the removal of dissolved gasses from water enhances the dispersion of hydrophobic oil in water and these surfactant free emulsions do not lose their stability when the previously removed gasses are reintroduced. This work has demonstrated the formation of a stable emulsion of Silicone Oil in degassed ultra-pure water alone. The emulsion droplets were on the order of 50 nm in diameter and stable over a period of 8 hours. Stable emulsions of hydrocarbon oils in ultra-pure, degassed water were also prepared successfully, showing no oil/water separations after several freeze-pump-thaw cycles. Emulsions prepared in this manner were cloudy in appearance. However, after a day or two became completely clear with no oil/water separation. The formation of a stable emulsion in the complete absence of a surfactant could provide an alternative approach to a physiologically safe drug carrier. The emulsion's structure and stability were characterized using small angle x-ray scattering.

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