

Abstract

Since microemulsions are transparent, they are an appropriate media for photochemical reactions which are induced via light irradiation. The phase behaviour of microemulsions is influenced *in situ* by the reaction of UV-sensitive amphiphiles. In this work the variance of the curvature of the amphiphilic interfacial film caused by UV reactions is used to compensate for structural changes during the contemporaneous polymerisation of the bicontinuous oil phase. In this manner, the phase separation of the system is eliminated and growth in the size of the polymeric structures was reduced. Differences in the reaction rates inhibited a complete preservation of the initial structure. Because of the slower polymerisation rate of oil droplets compared to the continuous oil phase, their swelling was eliminated by the reaction of the UV-sensitive surfactant completely, so that polymer particles with a diameter of 4 to 10 nm were obtained. This equates to the size of the microemulsion droplets. The reaction of one of the UV-sensitive co-surfactants used in this work requires acetone. In the context of formulating acetone containing microemulsions as reaction media for photochemistry, the phase behaviour and the microstructure were investigated. Due to the strong solvation properties of acetone these systems are promising candidates as reaction media. It should also be noted that acetone is a common triplet sensitizer. Thus, these systems provide opportunities for photochemical reactions in microemulsions.