Properties of microemulsions with mixed nonionic surfactants and mint oil

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Water + propylene glycol/sucrose laurate / ethoxylated mono-di-glyceride / peppermint oil microemulsion systems were formulated and characterized using electrical conductivity, dynamic viscosity, dynamic light scattering, and small angle X-ray scattering. The maximum water solubilization in the peppermint oil was found to be dependent on the surfactants mixing ratio (w/w). Static percolation phenomenon was observed in these systems. The activation energy of conductive flow depends on the surfactants mixing ratio. The hydrodynamic diameter of the diluted microemulsions decreases with the increase in temperature. The periodicity, that is a characteristic length for the domain size of the microemulsions, increases with the increase in the aqueous phase content, whereas the correlation length, that is also a characteristic length for the domain size, increases and decreases with the increase in the aqueous phase content indicating the onset of structural transitions. A progressive transformation of water-in-oil to bicontinuous and then to oil-in-water microemulsions, occurring upon dilution with water is suggested [1, 2].

1. M. Fanun, J. Colloid Interface Sci. 2010, 343, 496