Study of the Effect of Oil Phase on Electrical Percolation Process in Water-in-Oil Microemulsion Systems

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The nature of the oil phase in a water-in-oil microemulsion significantly affects the electrical percolation phenomenon occurring in the microemulsion. Different types of oil affect the rigidity of the interfacial surface, the interaction of surfactant monomers, and the size of water droplets, which play a decisive role in the formation of conductive paths during percolation. The effect of octane, decane, undecane, dodecane, hexadecane, and isopropyl myristate on the electrical percolation threshold in microemulsions prepared on the basis of sodium bis(2-ethylhexyl)sulfosuccinate (AOT) was studied. It was found that water-induced electrical percolation was observed only in the case of octane (W=52) and decane (W=34). It should be noted that the use of isopropyl myristate in combination with saturated hydrocarbons in the oil phase shifts the percolation temperature threshold to higher temperatures. In addition, the addition of isopropyl myristate completely eliminates water-induced electrical percolation in the water/AOT/decane reverse microemulsion system.