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# Distribution potential in electrified microemulsions with potential determining salts

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## ABSTRACT

The electrical polarization of lamellar and water-in-oil microemulsions composed of the aqueous solution of a potential determining salt (PDS), an organic solvent and a nonionic surfactant has been studied. The distribution of the PDS ions across the interface between two immiscible electrolyte solutions (ITIES) generates an electrical potential difference which can be used to control charge transfer processes. In macroscopic ITIES, this distribution potential is independent of the PDS concentration and can be determined from the electroneutrality condition far from the interface. In microemulsions, on the contrary, the distribution potential is smaller in magnitude and depends on the PDS concentration, the surfactant concentration and, in principle, the microemulsion (geometrical) structure. This different behaviour appears because the interfacial area per volume is so large that the charge needed to establish the macroscopic distribution potential exceeds the total charge present in the system, and hence large deviations from local electroneutrality occur in the whole microemulsion.

**KEYWORDS:** Distribution potential, Potential determining salt, Microemulsion, ITIES, Electroneutrality, Poisson-Boltzmann equation

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