

Abstract

New Potentiometric Surfactant Sensor for Anionic Surfactants Determination in Real System Containing Amphoteric Surfactants †

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Abstract: Surfactants are used for washing, cleaning and disinfection in many every-day products like detergents, cleaning agents, cosmetics, but also in a broad spectra of industry (detergents, pharma, oil exploitations, textile, etc.). Surfactants are divided into four groups: anionic, cationic, nonionic and amphoteric. On the global scale, the demands for surfactants are constantly growing (CAGR of 4.5% from 2020 to 2025) mainly because of the population growth and life-standard increase. This will make an additional pressure on surfactant pollution of waters. For this reason, it is important to establish fast and sensitive analytical tools for surfactant quantification in water, but also as a quality control tools in production processes. New ion-pair 1,3-dihexadecyl-1*H*-benzo[*d*]imidazol-3-ium-tetraphenylborate (DHBI-TPB) was used as an ionophore for fabrication of PVC-based potentiometric surfactant sensor for quantification of anionic surfactants in real samples. Direct potentiometric response measurements showed excellent response characteristics with a Nernstian slope in the linear response region for all investigated surfactants. Developed surfactant sensor was used for potentiometric titrations of anionic surfactants in model and real samples containing amphoteric surfactants betaine or amine oxide, and showed excellent performances and good recoveries. The sensor showed high stability, reproducibility and long-lifetime.

Keywords: surfactant sensor; potentiometry; ionophore; amphoteric surfactants