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Ion-specific effects and adsorption capacity of ionic surfactants with simple molecular structure can be predicted and used to control the stability of foams and emulsions

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A simple procedure on predicting the adsorption capacity and the ion-specific effects of ionic surfactants has been suggested. The adsorption energy of the hydrocarbon tail has been calculated by means of the contributions from each methylene group, the hydrophilic head of the molecule and the number of the water molecules displaced from the Water/Air interface during the adsorption of one molecule. The contributions from different polar heads were tabulated. The contributions from the counterions were calculated by means of recently developed theory on the London interaction of one counter-ion with the Air/Water interface. The simple theory of Davies for adsorption of ionic surfactants was utilized for our particular task. Thus, one can tailor the adsorption properties of any ionic surfactants by having the structure of the hydrocarbon tail, the hydrophilic head and the type of the counter-ions. It was clearly demonstrated experimentally and explained theoretically the electrostatic stabilization of foam films by different types of surfactant counter-ions in line with the Hofmeister series. It was shown as well that the stability of foams and emulsions can be controlled by careful selection of the type of the counter-ion. Our findings are just beginning of building of powerful procedure, by which one can tailor the durability of foams and emulsions by selecting ionic surfactants with proper counter-ion and appropriate method for generating foams and emulsions.

Biography

Stoyan I. Karakashev has completed his Ph.D. at the age of 32 years from Sofia University, Bulgaria, and postdoctoral studies in the Universities of Newcastle and Queensland, Australia. He is currently Assoc. Prof. in the Department of Physical Chemistry at Sofia University. He has published 50 papers in reputed journals and serving as editorial member of the Journal of Applied Chemistry.

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