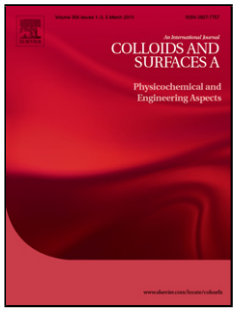

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Effect of concentration and addition of ions on the adsorption of sodium dodecyl sulfate on stainless steel surface in aqueous solutions

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ABSTRACT

The adsorption characteristics of sodium dodecyl sulfate (SDS) on stainless steel surface in aqueous solutions as well as the effect of added $NaClO_4$ on adsorption are investigated. The stainless steel surface is hydrophobic when wetted by water and negatively charged in SDS solutions, which was characterized by performing open circuit potential (E_{OCP}) and zero charge potential (E_{PZC}) measurements. The adsorption isotherm of SDS on stainless steel surface in SDS aqueous solutions was measured by quartz crystal microbalance (QCM). The results indicate a four-stage adsorption process according to the micellization of SDS molecules both in bulk solution and on stainless steel surface. With the increase of SDS concentration, the mass of the adsorbed SDS molecules increases, while the structure of the adsorbed layer changes from monomers to hemimicelles. In the presence of $NaClO_4$ as background electrolyte, the adsorption isotherm shifts to lower SDS concentration regime, mainly as a result of