

ADSORPTION AND ASSOCIATION OF XANTHINE IN ABSENCE AND PRESENCE OF SOME DIVALENT METAL IONS AT THE MERCURY/SOLUTION INTERFACE

M. E. AHMED, M. S. IBRAHIM, Y. M. TEMERK and A. M. KAWDE
Chemistry Department, Faculty of Science, Assiut University, Assiut, Egypt

(Received 13 December 1995; in revised form 20 February 1996)

Abstract—The adsorption and interfacial orientations of xanthine were studied by out-of-phase *ac* voltammetry at a hanging mercury drop electrode. The adsorption equilibrium and its attainment have been investigated as a function of various parameters such as pH, adsorption potential, temperature, adsorption time, the nature of anions of the supporting electrolyte and the bulk concentration of xanthine. The changes in the stacking interactions of xanthine molecules in the presence of Cd(II), Cu(II), Co(II), Ni(II), Ca(II) and Mg(II) were studied by *ac* voltammetry as changes in “pits” or “wells” on double layer capacitance curves due to adsorption and association of M(II)–xanthine complexes on the charged interface. The results indicate that the complexation of xanthine molecules enhances the stacking interactions and hence would be expected to facilitate the formation of perpendicularly stacked layer of M(II)–xanthine complex on the electrode surface. The time dependence of the electrode impedance indicates that the formation of a compact film in absence and presence of these metal ions controlled by a fixed number of nuclei and the data were analysed according to the Avrami equation. The adsorption parameters of xanthine have been computed at different pH values in the absence and the increased presence of metal ions. Copyright © 1996 Elsevier Science Ltd

Key words: adsorption, association, *ac* voltammetry, xanthine