E2-29: Electrochemical behaviour of carboxylic acids on platinum electrodes

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Electrochemical characterization of polar organc molecules in aqueous medium on platinum electrodes is an area of classical interest. The formation of platinum oxide and subsequent reduction, and hydrogen adsorption/desorption are influenced by the presence of such molecules in the medium.

Cyclic voltammetric studies of aqueous phosphate buffer solutions (pH 7) with sequential addition of saturated aliphatic carboxylic acids, showed the effects of these molecules on the voltammetric peak currents and peak potentials. The presence of carboxylic acids in the medium, completely altered the hydrogen adsorption/desorption region, indicating the change in the interfacial behaviour of the platinum surface. Although formic acid showed the greatest change, the current responses of acetic acid and propionic acid in this region showed a better quantitative relationship with concentration. The potential at which platinum oxide was reduced was also

strongly affected by the presence of carboxylic acids. The positive shift of the potential of this peak was also quantitatively related to the bulk concentration of each acid. Such relationships demonstrate the potential utility of platinum electrodes as analytical sensors for this class of compounds.