17. The oxide gold anodically grown on the confined aqueous layer bounded by the water/ anisol interface

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Preliminary work for the captive drop of an organic liquid immersed in the aqueous environment on the gold surface, shows that the contact angle is very close to 0o. The surface of gold electrodes in the double layer and in the gold oxide regions are investigated at pH 7 in confined phosphate buffer aqueous solutions and in 0.5 M HClO4 using Contact Angle (CA), Voltammetry, and Electrochemical Impedance Spectroscopy (EIS) techniques. Different experiments are performed using Benzene, Toluene, Anisol, Hexane, m-Xylene, Choroform and Butylacetate [1] developing different external water/solvent interfaces. The EIS results for the electrode in contact with solvents are similar to that observed in the absence of solvent. The capacity value is similar in the double layer region and at 1.7 V vs SHE for the first minutes of the oxide monolayer growth. For longer times at 1.7 V a second time constant rises at lower frequencies showing the effect of the different solvents on the oxide layer aging. Particularly an increase of the contact angle is also noticed in contact with anisol. These effects point to an increase of the surface heterogenity induced by either the oxide growth and aging or the lifting of the surface reconstruction in the water double layer region similar to that reported for Au(100): hex  (1x1). The capacity measured are similar to that observed in the gold/electrolyte interface, showing that several layers of water remain on the cycled gold electrode after the addition of the organic solvent.