

Controlling and Probing the Nano Interaction Between Organic Molecules and Al Alloys

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In this investigation the interaction between organic molecules and aluminium oxides is considered. The overall study concentrates on the chemical interface, created between an organic layer and an aluminium oxide layer. The knowledge of the composition and structure of the aluminium oxide surface layer is important for the bonding between aluminium and polymers. For obtaining this information a complementary approach is used based on a number of surface analysis methods given different type of information. FESEM, FEAUGER, AFM and XPS were used to see the distribution and amount of the organic molecule present over the surface. An approach is given to verify to what extent a monolayer is formed. In situ measurements can be combining Visible Spectroscopic Ellipsometry and Electrochemical Impedance Measurements. XPS and FTIR-RAIRS were used to study the nature of the interfacial bonding. So far data were obtained of phosphonic acids, carboxylic acids, esters, silanes and benzohydroxamic acids interacting with differently pretreated aluminium surfaces. It will be shown that the resulting aluminium oxide surface after pretreatment has an influence on the amount of organic molecules that are interacting with the aluminium surface. In the last part the effect of alloying elements such as Mg will be discussed.