Wetting and electrochemical properties of hydrophobic and superhydrophobic coatings on metals


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The combined analysis of the evolution of sessile drop parameters in contact with surface layer jointly with the data, obtained by electrochemical methods, gives the possibility to study the variation in the state of the surface due to the electrochemical reaction, associated with a corrosion process. We have compared the peculiarities of the corrosion process on different metals, such as titanium, low carbon steel, aluminium protected by 1) native oxide, 2) plasma electrolytic oxidation, 3) joint action of plasma electrolytic oxidation and hydrophobic layer as well as 4) plasma electrolytic oxidation with nanocomposite superhydrophobic coating. Among the coatings have been studied, the most effective corrosion protection in brine solutions and water was demonstrated by the nanocomposite superhydrophobic coating. The mechanisms of the corrosion protection are discussed.