Scanning Kelvin Probe Study on the Stability of the Steel/Coating Interfaces Contaminated by Soluble Salts

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Abstract:

The presence of hydrosoluble species, mainly chlorides and sulphates, at the metal/paint interface promotes osmotic blistering of the coating and underfilm metallic corrosion when the concentration of the soluble salts exceeds a critical level. Loss of adhesion and cathodic disbondment can be also consequences of the presence of soluble salts. These processes can lead to the deterioration of the paint system in a very short period of time. However, since the interface is not easily accessible by experiment, not much is known about interfacial structure, reactions and the processes causing degradation. Scanning Kelvin Probe (SKP) is an ideal tool for the in situ monitoring of the degradation processes at the buried interface. On the other hand, for an in-depth understanding it is important that the superposition of the effects of all different parameters involved can be disentangled. Hence, it is important to design experiments focussing on individual aspects of the complex system.A study of the fundamental aspects of the stability of the contaminated buried steel/coating interfaces, specially focused on the initial stages of blistering and underfilm corrosion, has been carried out. Results of the characterization study performed with a height-regulated SKP (HR-SKP) on surfaces contaminated at the interface by different salt concentrations with well defined crystal size and distribution are shown.