

Test of OIH gel composites with embedded corrosion inhibitors as corrosion protection coatings of hot-dip galvanized steel (HDGS)

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Although the use of HDGS (hot-dipping galvanized steel) in reinforced concrete structures shows improved corrosion resistance due to the presence of the zinc layer when in contact with fresh concrete is strongly affected by the hydrogen evolution. Surface treatments such as chromate conversion layers (CCCs) are usually used to prevent this initial corrosion process which involves the use of reagents that have high impact in environment and ecosystems. In this work sol-gel process was used to produce environmental friendly corrosion protection coatings based on organic-inorganic hybrid (OIH) gels with embedded corrosion inhibitor agents.

The corrosion behavior of HDGS samples coated with different ureasilicate based gels doped with distinct inhibiting ionic species: sodium heptamolibdate, potassium hydrogenofosphate, K_2HPO_4 ; and zinc nitrate, $Zn(NO_3)_2$ - were tested in contact with simulate concrete media, by monitoring the corrosion current variation with the time. The electrical properties of the used OIH gels were characterized to allow the correlation of the data obtained by the two techniques (polarization curves and impedance). Both OIH gel films and coatings were prepared and HDGS coated samples were characterized according to the procedure reported in the literature [1,2].

[1] RB Figueira, CJR Silva, EV Pereira, and MM Salta, J. Electrochem. Soc., 2013, 160, C467

[2] RM Figueira, EV Pereira, CJR Silva and MM Salta, Portugaliae Electrochimica Acta, 2013, 31(5), 277- ??.

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