TITLE: ***Nanotechnology applied to corrosion inhibition: nanoceramics based on alumina and zirconia.***

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ABSTRACT

This work presents the study of a nanoceramic material, based on a matrix of Al2O3 with addition of ZrO2 15% in mol, as corrosion inhibitor in metallic substrates: steel carbon, steel galvanized minimized and aluminum. The characterization of the formed oxides was carried out by the study of Fourier´s Transformed Infrared Spectroscopy (FTIR) and Ray X diffraction. From the results of Ray X diffraction it was possible to determine the majority phase of formed oxide, as well calculated the nanoparticles diameter. The efficiency of the corrosion inhibition from different metallic substrates were compared to pre-treated pieces by conventional phosphatated methods and a nanoceramic zirconium based material, already utilized in the industry. The electrochemical methods to investigate the corrosion inhibition efficiency comprehend: curves of potential versus time, at open circuit, curves of potentialdynamics polarization for analysis of stability and resistance of the film against corrosion and cyclic voltammetry. Salt spray test experiments during exposition around 500 hours, for verification of the performance of the composite Al2O3/ZrO2 against corrosion, in plates with organic covering, showed that had barely migration of corrosion in the cut of 3 to 5 mm for steel carbon and in the steel galvanized occurred the white corrosion of zinc and nothing related to the aluminum. The results were sufficiently acceptable and showed that these synthesized material, based on nanoceramics, can replace conventional phosphatated process, that are more devastating in an environmental perspective.

Key-words: corrosion inhibition, alumina and zirconia.