EFFICIENCY OF BENZOTRIAZOLE AS A CORROSION INHIBITOR FOR ZN-MG COATED STEEL IN CHLORIDE SOLUTION

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Thanks to its high corrosion resistance, zinc coated steel is largely used in wide range of industries such as automotive, construction or household appliances. However, the sensitivity of zinc to aggressive environments, the intensive consumption of zinc and the increase in coating price are so many factors that are limiting the use of zinc coatings. A large number of new coated steel formulations have consequently been studied for many years in order to reduce the consumption of zinc and its cost in coatings. Several studies have shown that the addition of magnesium into the metallic coating allows to improve corrosion resistance in atmospheric conditions without increasing coating thickness. However the Zn-Mg coatings applied on steel remain critically reactive in immersion in aggressive environments due to a high dissolution rate of magnesium. In literature, there is very few information about the corrosion protection of these substrates, in particular as regards the action of corrosion inhibitors.

The present work aims at investigating the efficiency of benzotriazole (BTAH) as a corrosion inhibitor for zinc-magnesium coated steel when it is added in sodium chloride solution in two different ways: directly inside the aggressive solution and incorporated in layered double hydroxide containers (LDH-BTAH).

Electrochemical and analytical measurements combined with surface analyses are used to understand the action of BTAH on the metallic surface to prevent corrosion. The layered double hydroxide is characterized by means of infrared spectroscopy and X-ray diffraction. BTAH release from LDH-BTAH is investigated using UV-vis spectroscopy and its inhibitive effect is analysed by electrochemical impedance spectroscopy.

Keywords: metal coatings, magnesium, corrosion inhibition