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SELF HEALING COATING ON ALLUMINIUM ALLOY (AA2014) USING SOL-GEL PROCESS

Saurabhkumar jha, Shailesh kumar Prasad and Sudhanshu Shekhar pati

Department of chemistry NIT Jamshedpur

ABSTRACT

Nowdays, the main problem we face is the delamination of the coating. It is a challenge for us to develop a coating that increases the adhesion of the coating to the substrate. By forming a dense coating, sol-gel acts as a film barrier for diffusion of aggressive species such as chloride, oxygen. It blocks the transfer of metal surface to and from the environment. We can also incorporate inhibiting compounds, which provide another mechanism for corrosion protection. The sol-gel route is based on the evolution of a colloidal system through the formation of an inorganic or hybrid sol followed by gelation to form a continuous polymer network gel.In this paper, a new doping concept has been improved which shows self-healing properties by sustained release of corrosion inhibitors in a carrier system. Zeolite were doped with two corrosion inhibitor cerium and 8-hydrxoquinoline in a sequential manner. 8-hydrxoquinoline and cerium are good corrosion inhibitor due to high inhibiting efficiency. The anti-corrosive properties on AA2014 aluminium alloy was tested by electrochemical impedance spectroscopy. The result shows that both inhibitors were successfully embodied in a sol-gel. The sol-gel coating doped with both inorganic and organic inhibitors give a satisfying result. Releasing the event of inhibitor depends on the pH value of the corrosion environment. The Loading extent of zeolite for 8-hydrxoquinoline inhibitor is more than cerium. The impedance itemization of sol-gel coating with 1 weight % gives different results in the doping process. The barrier properties of the best coating divulge by high pore resistance with having high impedance value at low frequency. The immersion test confirmed that the double doping concept is valuable for both long and short immersion times.

Keywords:sol-gel,zeolite,coating,inhibitor,immersion test.