19th Global Chemistry, Chromatography & Spectrometry Conference

March 20-21, 2019 | New York, USA

ACCEPTED ABSTRACTS CHEMICAL SCIENCES JOURNAL 2019, VOLUME 10 | DOI: 10.4172/2150-3494-C1-033

Application of hybrid zinc coatings for improved corrosion resistance

N Boshkov
Bulgarian Academy of Sciences, Bulgaria

The controlled release of anticorrosion inhibitor from "smart" nanocontainers (NCs) incorporated into a zinc coating matrix can prolong the corrosion protection of steel structures. Core-shell nanocontainers impregnated with a corrosion inhibitor for steel benzotriazole are formed using layer-by-layer deposition of poly (diallyl dimethyl ammonium chloride) and poly (acrylic acid) onto kaolinite particles at close to neutral pHs. Electric light scattering method and electrophoresis are employed to control the size and electrical characteristics of NCs, as well as the stability of their suspensions. The release properties of the nanocontainers are investigated using UV-spectroscopy. The inhibitor loaded core-shell NCs are incorporated into the volume of a zinc coating during electrodeposition on the surface of low carbon steel substrate to ensure additional self-healing effect in the case of corrosion attack. The surface morphology of thus obtained hybrid coating is demonstrated by scanning electron microscopy. The influence of NCs present in the zinc electrolyte on the cathodic and anodic processes is investigated by cyclic voltammetry. The corrosion behavior of the hybrid coating at conditions of external cathodic and anodic polarization is tested with potentiodynamic measurements and the results are compared to pure zinc coating. The coating with embedded NCs revealed enhanced corrosion protection of low carbon steel in comparison with the pure zinc coating in neutral corrosion medium (5% solution of NaCl).

NBojkov@ipc.bas.bg