Applying Zr702 Layer on Commercially Pure Aluminum Coated Magnesium Alloy Using Cold Spray Process

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In this research, dense commercially pure (CP) aluminum coating was applied on Mg alloy using cold spray process without post-or in-situ spray treatments and usage of high process gas (N2) temperatures. This coating considerably reduced the surface activity of Mg alloy in 3.5wt.% NaCl solution. CP-Zr702 (with 4.5wt.% Hf, Max) is known for its superior corrosion resistance in chloride salt solutions. So, a part of Al coating thickness was then replaced by Zr702 layer. It is expected that this layer could considerably densify the outer and inner (subsurface) layers of Al deposited coating and alleviate the problems associated with the cold sprayed Al coated Mg alloys (including lower micro-hardness, wear resistance and also high susceptibility to localized corrosions in chloride containing solutions). It is speculated that CP-Al inner barrier layer with high compactness could protect the Mg substrate from corrosive solution if it passes through from Zr702 top layer during extended long-term immersion in corrosive solution.

Bio

Dr. Daroonparvar as director of research and development department of ASB Industries Inc, and also adjacent professor of University of Nevada, Reno, has more than 10 years of academic and industrial experiences in the field of micro-structural characterization, corrosion and oxidation behavior evaluation of different surface coatings (particularly, plasma, thermal and cold sprayed coatings). Dr. Daroonparvar has published articles in many peer-reviewed journals and has been serving as reviewer and associate editor for several years. Journals such as Corrosion Science, Applied Surface Science, Surface and Coating Technology, Alloys and Compounds, Materials Science and Engineering C, Materials letters, and etc., where he has been recognized as an outstanding contributor as a reviewer.