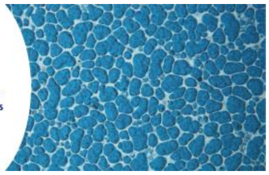

# Effect of the different $Al^{3+}/Zn^{2+}$ ratios and substrate content in Al and Mg on formation and corrosion resistance of ZnAl hydrotalcite conversion layer grown in situ on Zn coated steel

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***Keywords:*** *hydrotalcite conversion layer, corrosion resistance, Zn coated steel*

Hydrotalcites (HT) with anion exchange capacity is used as inhibitor container for corrosion protection of metals and alloys [1]. Moreover, they can directly grow on metal substrates and form a protective film with strong adhesion by simple synthesis methods, so they stand out from other nanocarriers in corrosion protection [2]. Very recently, the process of hydrotalcite formation and anti-corrosion by the ZnAl-HT films on galvanized steel have been started to be investigated [3]. However, the optimal conditions for the preparation of ZnAl-HT conversion film on galvanized steel and Zn-Al alloys coated steel have not yet been fully characterized.

The dissimilarities of the composition, crystal structure, and corrosion resistance of ZnAl-HT conversion films grown "in situ" on electrogalvanized steel substrate for different $Al^{3+}/Zn^{2+}$ ratios as well as Zn-1.2Al, Zn-9.4Al, and Zn-7.2Al-4.0Mg coated steel substrates for $Al^{3+}/Zn^{2+}$ ratio of 5/3 at pH 12 were investigated. The corrosion behavior of all conversion films in 0.1 M NaCl was compared through electrochemical techniques (polarization curves and EIS). The composition, morphology, structure, and thickness of all conversion films were characterized by Fourier-transform infrared spectroscopy (FT-IR), scanning electronic microscopy (SEM), and electron microscopy/energy dispersive X-ray spectroscopy (SEM/EDS), and X-ray diffraction (XRD).

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