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ON THE WET CHEMISTRY PREPARATION OF LAYERED DOUBLE HYDROXIDE AND MIXED-METAL OXIDE COATINGS

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Layered double hydroxides (LDHs) are attractive materials that serve as reservoirs and delivery carriers of functional molecules. LDHs are compounds composed of positively charged brucite-like layers with an interlayer gallery containing charge compensating anions and water molecules. The metal cations occupy the centres of shared octahedral whose vertices contain hydroxide ions that connect to form infinite two-dimensional sheets [1-4]. A general chemical formula of LDHs could be expressed as $[M^{2+}_{x}M^{3+}_{1-x}(OH)_{2x}A\cdot zH_2O]$, where M^{2+} and M^{3+} are divalent and trivalent metal ions and A^{-} is an intercalate anion which compensates the positive charge created by the partial substitution of M^{2+} by M^{3+}. After calcination at temperatures from 300 to 600 °C, LDHs are converted to the mixed metal oxides (MMO) with high specific surface area and basic properties. MMO ability to recover the original layered structure is a property known as „memory effect" [5]. LDHs materials have been considered as environmentally friendly containers for active corrosion protection of Mg and Al alloys [6] and heterogeneous catalysts [7]. These LDH materials have the ability to release inhibitors in a controlled manner which can be turned to conform to an increase of the aggressiveness of the environment or corrosion initiation on the metallic substrates.

In this way, the main aim of this study was to investigate Mg-Al-layer double hydroxide seeded growth using co-precipitation and sol-gel method and formation of Mg-Al (mixed metal oxide) with PVA solution on Si and stainless steel substrates through the dip-coating technique. The obtained thin films were characterized by X-ray diffraction (XRD) analysis and scanning electron microscopy (SEM).

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