

Stage I : 12.07.-31.12.2012 : 252 181 lei

Preparation and characterization of powdered and thin films of Mg-Al and Zn-Al LDHs. Wettability of the LDHs thin films. Thermal effect treatment of Mg-Al, Zn-Al thin films

Mg-Al and Zn-Al based double layered hydroxides powders were prepared by partner P1-UB. The molar ratios range lied between 2-5.

The as prepared powders were fully characterized by: X-ray diffraction (XRD) for structural information, scanning electron microscopy (SEM) for morphological data, energy-dispersive X-ray dispersive (EDX), atomic absorption spectroscopy (AAS) for the chemical composition, DRIFTS , DR-UV-VIS and FT-IR spectral analysis, thermal analysis (TG-DTA) and textural analysis (BET) (CO-INFLPR, P1-UB, P2-ICECHIM).

The spectral analysis are presented thoroughly in the scientific report, due to the relevance of the spectral analysis for understanding tthe organic molecules intercalation mechanism in the LDHs based nanocomposites to be prepared in the next stages.

The effect of the reactants on the synthesis protocols were evidenced. Molar ratios between Mg/Al and Zn/Al between 3-4 are proper to produce highly crystalline impurities-free layered double hydroxides.

LDH thin films using targets of with the following ratios Mg/Al=2 and 3 and Zn/Al=2 and 3. Pulsed laser deposition (PLD) and matrix assisted pulsed laser evaporation (MAPLE). (CO-INPLPR). A 1064 nm wavelength secures the formation of a pure lamellar phase for the PLD deposition . For the other armonics 266 nm and 532 nm the formation of mixed oxides as result of the LDH target decomposition for the Mg-Al based thin films. MAPLE used at 266 nm seems to favor the deposition of highly crystalline Zn-Al based LDH films.

The contact angle of a test Mg₃Al thin film prepared via MAPLE are sensitive to the ambient exposure , The film evolves from a highly hydrophobic film to an almost hydrophilic film in 7 days.

In addition the effect of the different types of used raw materials and protocols used for the preparation of both the LDH powders and targets were studied. The Consortium decided to extend these studies.