Synthesis and water dispersion of two-dimensional layered double hydroxides

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Layered double hydroxides (LDHs) are a class of anionic clays consisting of positive charged brucite-like layers spaced by water molecules and counterbalancing anions [1]. In particular, LDHs based on the first row of transition metals have recently drawn attention due to their (electro)photocatalytic properties [2]. Differently from other layered materials (*e.g.*, graphite, hexagonal boron nitride, transition metal mono-di-chalcogenides, MXenes, …) [3,4,5], LDH layers are held together by the electrostatic forces between layers and anions amid them and a dense network of hydrogen bonds that involves interlayered water molecules and hydroxyl terminations on layer surfaces [1]. In our work, we propose an environmentally friendly synthesis procedure able to produce two-dimensional LDH materials. The formation of single layer nanosheets is confirmed by X-ray diffraction and atomic force microscopy analysis [6]. Lastly, we focus on the characterization of the optical and electrochemical properties of the nickel-iron LDH.

References

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Figures

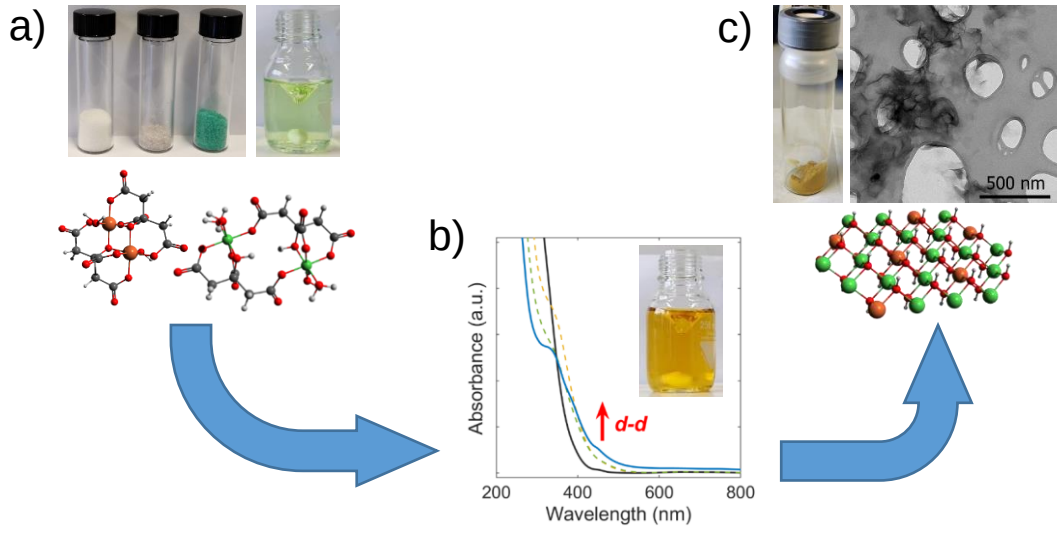

Figure 1: Synthesis process of LDHs. a) Nickel and iron citrate coordination compounds. b) The polymerization of citrate coordination compounds lead to an absorbance increase of d-d transitions. c) The nanostructured LDH product is collected and characterized.