

Solution processed nickel-iron layered double hydroxides for energy storage applications and glucose sensing

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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, transition metals LDHs have recently drawn attention because of their electrocatalytic and photocatalytic properties[2][3]. Contrarily to other layered materials[4], LDH layers are held together by electrostatic forces and a dense network of hydrogen bonds[1]. For these reasons, a careful choice of solvent capable to break hydrogen bonds is pivotal for an efficient exfoliation of the LDHs. One of the most effective solvent for LDHs exfoliation is formamide[5]. However, due to formamide toxicity and its high boiling temperature (210°C), other solvents are recommended for the processing of LDHs[6]. In our work, we report that stable dispersions of nickel-iron layered double hydroxide (NiFe-LDH), in water or ethanol, can be obtained by carefully tuning the pH during the NiFe-LDH synthesis and treating the final product with sodium acetate. The formation of single-layer nanosheets is confirmed by X-ray diffraction and atomic force microscopy data. Lastly, the investigation of NiFe-LDH as electrocatalyst for the OER and glucose oxidation is showing promising performances for practical applications.

REFERENCES

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FIGURES

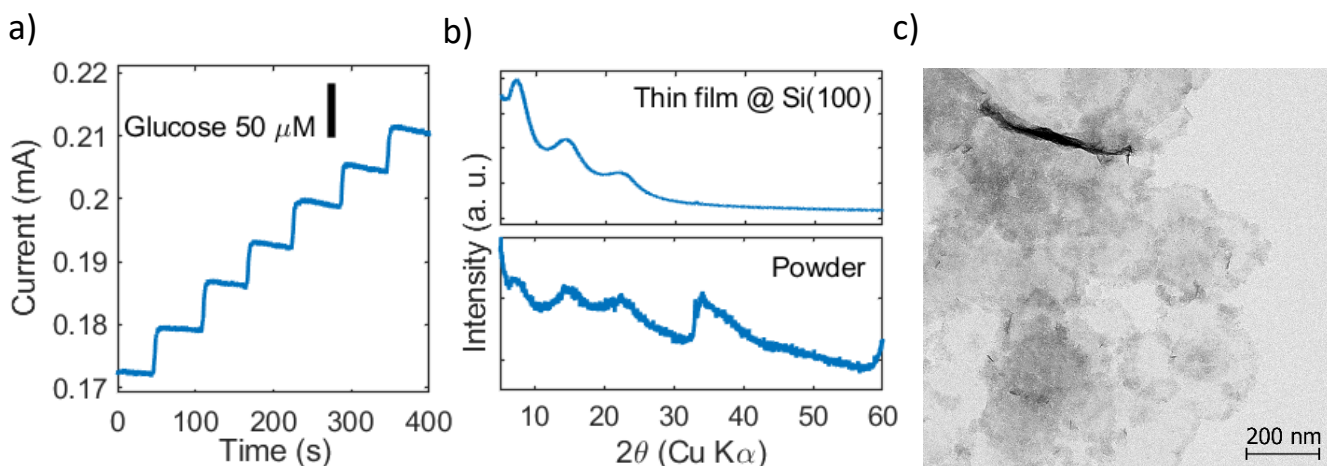


Figure 1: a) Glucose response of a NiFe-LDH electrode, b) XRD profiles of NiFe-LDH, c) TEM image of NiFe-LDH nanosheets.

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