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Synthesis and characterization of cobalt ferrite obtained by the protein SOL-GEL method and its application as an electrocatalyst in water electrolysis Bampoky, N.A.(1); De Vasconcelos, I.F.(1); Dos Santos, L.P.M.(2); Vasconcelos, V.M.R.(1); (1) UFC; (2) ;

Cobalt ferrite has been widely studied recently due to its high magnetic permeability and coercivity, good saturation, and excellent physical and chemical stability, making it attractive for various applications [1,2]. Thus, the present study aims to synthesize CoFe2O4 magnetic nanoparticles using the protein sol-gel method and apply them as electrocatalysts in water electrolysis [3]. The particles were obtained by dispersing gelatin in distilled water under constant stirring until a uniform gel was formed. Next, hexahydrated cobalt nitrate and nonahydrated iron nitrate were dissolved in distilled water and added to the gel with stirring. The solution was left to homogenize for 2 hours and then dried at 150°C for 6 hours. Thermal treatment was carried out at 400°C for 4 hours based on thermogravimetric analysis. After cooling, the calcined powder was placed in a 10% hydrogen peroxide solution to remove carbonaceous residues from incomplete gelatin combustion. Afterward, it was washed with deionized water and dried in an oven. X-ray diffraction characterization showed that a single cubic phase of spineltype cobalt ferrite was obtained. Transmission electron microscopy determined the particle mean size to be about 8 nm. UV-Vis analysis revealed an absorption band in the visible region, with an optical gap value of 1.76 eV. Lastly, the CoFe2O4 nanoparticles were successfully applied in the hydrogen and oxygen evolution reaction, showing performance similar to or better than some cobalt-based materials mentioned in the literature. References: [1] YAO, L. et al. Journal of Power Sources, Elsevier, v. 374, p. 142-148, 2018. [2] BELHADJ, H. et al. International Journal of Hydrogen Energy, Elsevier, v. 47, n.46, p.20129-20137, 2022. [3] MACÊDO, M.; SASAKI, J. M. Processo de fabricação de pós nanoparticulados.Patente: Privilégio inovação. Nº de registro: PI02038765, 2002.