Inkjet pring as high-throughput technique for fabrication of NiCo2O4 films

R.D. Bacelis-Martínez1, G. Oskam1,G. Rodríguez-Gattorno1,\*, M.A. Ruiz-Gómez2,\*

1Department of Applied Physics, CINVESTAV-IPN, Mérida, Yuc. 97310, México.

2CONACYT-Department of Applied Physics, CINVESTAV-IPN, Mérida, Yuc. 97310, México.

*reyna.bacelis@cinvestav.mx, gerko.oskam@cinvestav.mx, geonelr@cinvestav.mx,* miguel.ruiz@cinvestav.mx*.*

Table S1. Comparative results of NiCo2O4 electrocatalyst used for the oxygen evolution reaction (OER).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Synthetic method | Fabrication of working electrode | Electrochemical measurements | Current density (mA/cm2) obtained vs RHE | Ref. |
| Inkjet printing | NiCo2O4 film was printed directly onto FTO substrate. Area of 0.77 cm2. | 0.1 M KOH. 3 electrode configuration: Ag/AgCl (3 M) as a reference electrode and Pt-wire as the counter-electrode. | 2.7 at 1.67 V. | This work |
| Microwave heating method | NiCo2O4 powder dispersed in 2-propanol and 5 wt.% of polytetrafluoroethylene. Then, it was deposited on a surface of a graphite rod (area of 0.33 cm2). | 0.1 M KOH. 3 electrode configuration: saturated calomel electrode (SCE) as a reference electrode and Pt foil as the counter-electrode. | 1.8 at 1.65 V.  | 20 |
| Solvothermal | FTO substrate was placed in Teflon autoclave during solvothermal reaction for NiCo2O4 film preparation. | 1 M KOH. 3 electrode configuration: saturated calomel electrode (SCE) as a reference electrode and a silver wire as the counter-electrode. | Nanosheets: 2.6Nanoneedles: 7.5at 1.76 V. | 17 |
| Solvothermal | Slurry of 70 wt. % NiCo2O4 powder, 20 wt.% carbon black and 10 wt.% PVDF binder in n-methyl-pyrrolidone solvent. The slurry was spread on Ni foam substrates with a 1 cm2 area. | 1 M NaOH. 3 electrode configuration: saturated calomel electrode (SCE) as a reference electrode and a graphite rod counter-electrode. | 10 at 1.52 V. | 22 |
| Coprecipitation route | A NiCo2O4 powder and acetylene black mixture (weight ratio of 1:1) was deposited on the GC surface. Rotating ring-disk electrode was used, which consists of catalyst film-coated GC disk (0.196 cm2 of area) surrounded by a Pt ring (0.125 cm2 of area). | 0.1 M KOH. 3 electrode configuration: Ag/AgCl (1 M Cl-) as a reference electrode and Pt-wire as the counter-electrode. | 10.9 at 1.67 V. | 19 |
| Coprecipitation method | NiCo2O4 coating was prepared by dispersion of precipitates in acetic acid and then directly deposited onto a 0.5 cm2 Ni substrate. | 1 M KOH. 3 electrode configuration: saturated calomel electrode (SCE) as a reference electrode and Pt foil as the counter-electrode. | 181 at 1.77 V. | 18 |