Supporting Information

Fabrication of honeycomb-structured composite material of Pr_2O_3, Co_3O_4, and graphene on nickel foam for high-stability supercapacitor

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S1 Preparation of Pr_2O_3/Co_3O_4/NF composite electrode

0.85 mmol of cobalt acetate and praseodymium acetate, and 1 mmol of urea were dissolved in 15 mL of deionized water and stirred magnetically for 80 min to form a homogeneous solution. A portion of the above-treated NF and mixed solution was transferred to a 25 mL autoclave lined with PTFE and reacted for 12 h in an oven at 180 °C. After being washed with ethanol and deionized water, the Pr_2O_3/Co_3O_4/NF precursor was dried in an oven at 90 °C for 4 h. After 2 h of annealing in a muffle furnace at 300 °C, the Pr_2O_3/Co_3O_4/NF composite electrode was produced.

S2 Preparation of Pr_2O_3/rGO/NF composite electrode

In 7.5 mL of deionized water, 0.85 mmol of praseodymium acetate and 1 mmol urea were dissolved and magnetically agitated for 40 min to generate a homogenous solution. Then, 7.5 mL of homogenous graphene oxide suspension with a concentration of 2 mg·mL^{-1} was added. Continue magnetic stirring for 40 min to ensure thorough mixing. The processed NF and combined solution were placed in an autoclave with polytetrafluoroethylene and reacted for 12 h in an oven at 180 °C. The precursor was cleaned with ethanol and deionized water before being dried in a 90 °C oven for 4 h. Finally, the Pr_2O_3/rGO/NF composite electrode was created by annealing it for 2 h in a muffle furnace at 300 °C.

S3 Preparation of Co_3O_4/rGO/NF composite electrode

0.85 mmol of cobalt acetate and 1 mmol urea were diluted in 7.5 mL deionized water and magnetically agitated for 40 min to generate a homogenous solution. Then 7.5 mL of homogenous graphene oxide suspension with a concentration of 2 mg·mL^{-1} was added. Continue magnetic stirring for 40 min to thoroughly combine. A portion of the above-mentioned treated NF and the combined solution were placed to an autoclave with polytetrafluoroethylene and reacted in an oven at 180 °C for 12 h. The precursor was washed with ethanol and deionized water before being dried in an oven at 90 °C for 4 h. The Co_3O_4/rGO/NF composite electrode was formed after 2 h of annealing in a muffle furnace at 300 °C.

S4 Preparation of rGO/NF composite electrode

Added 7.5 mL of deionized water and 7.5 mL of graphene oxide suspension with a concentration of 2 mg·mL^{-1} to the beaker. Mixed well with magnetic stirring for 80 min. A portion of the above-mentioned treated NF and the combined solution were placed in an autoclave with polytetrafluoroethylene and reacted in an oven at 180 °C for 12 h. The precursor was placed in a crucible and annealed at 300 °C for 2 h before being dried in a 90 °C oven for 4 h. The rGO/NF composite electrode was formed after 2 h of annealing in a muffle furnace at 300 °C.

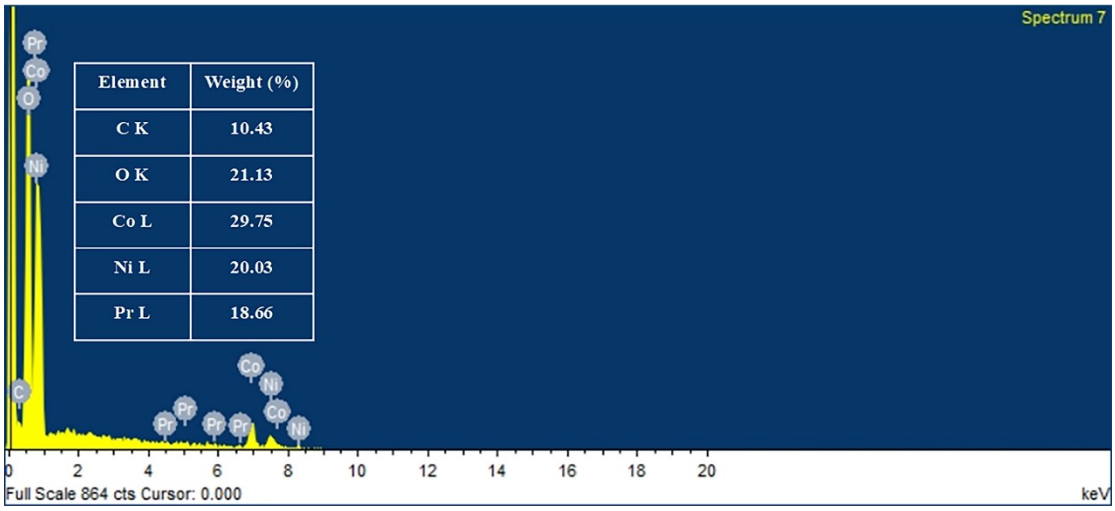

Fig. S5 EDS of Pr_2O_3/Co_3O_4/rGO/NF composite electrode.

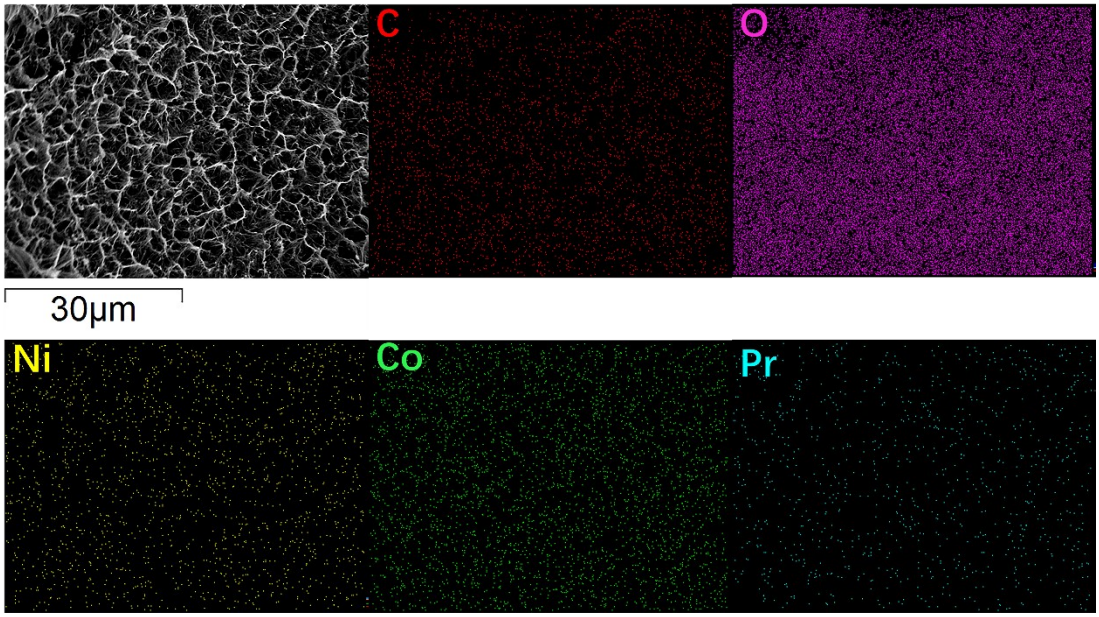

Fig. S6 EDS elemental mapping images of Pr_2O_3/Co_3O_4/rGO/NF composite electrode.