

PANI/g-C₃N₄ composite over ZnCo₂O₄/Ni-foam as a bi-functional electrode towards supercapacitor and electrochemical glucose sensor

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Preparation of g-C₃N₄

g-C₃N₄ was prepared by thermal decomposition of urea in closed crucible at temperature of 550 °C for 2 h with temperature ramp of 3°C/min. Then sample was collected after automatic cooling of furnace and stored it for usage.

Solid state electrolyte preparation

2 g of polyvinyl alcohol was dissolved in 10 mL of DI water (Sol A) and 3 g of potassium hydroxide was dissolved in 5 mL of DI water (Sol B). Sol B was added to sol A with vigorous stirring and stirred for 30 mins to obtain gel electrolyte.

Detailed preparation procedure for rotating disk working electrode

Ink preparation is similar to electrochemical sensor ink preparation. Initially, pre-cleaned RDE was connected to equipment, RDE was made to rotate at 300 rpm and 7 uL of ink was dropped over glassy carbon surface of RDE and rotation was raised to 500 rpm. Rotation was done until complete solvent was evaporated and dried surface was used for kinetic studies.

Detailed fabrication procedure of Swagelok cell for supercapacitor

Prepared electrodes were pressed with 2 tons' pressure in hydraulic press to form thin sheets. Then sheets were cut into 4 mm x 4 mm pieces, kept face to face with separator (whatman filter paper) and dipped in electrolyte for 1 mins. Finally, assembled supercapacitors was dried in air for 24 h. For analysis assembled supercapacitors were placed inside Swagelok cell setup.

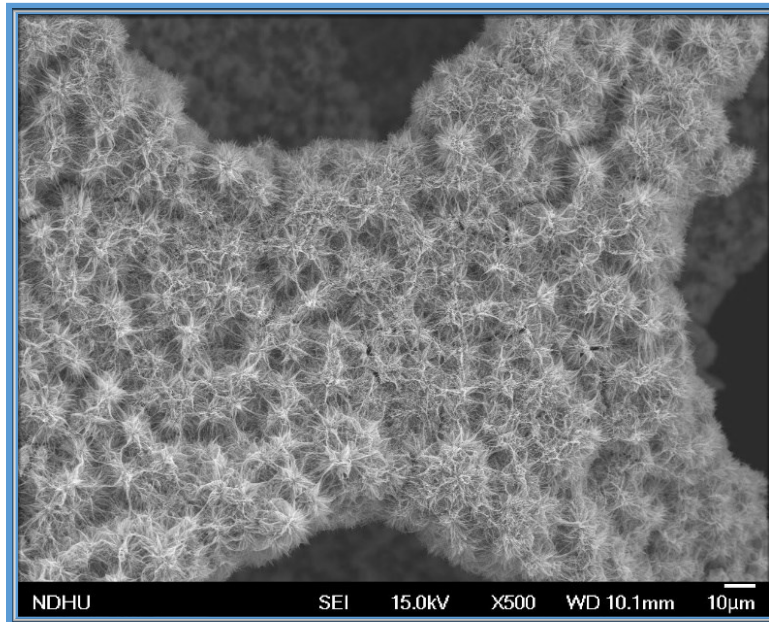


Fig. S1. SEM image of ZnCo₂O₄ coated over Ni foam.

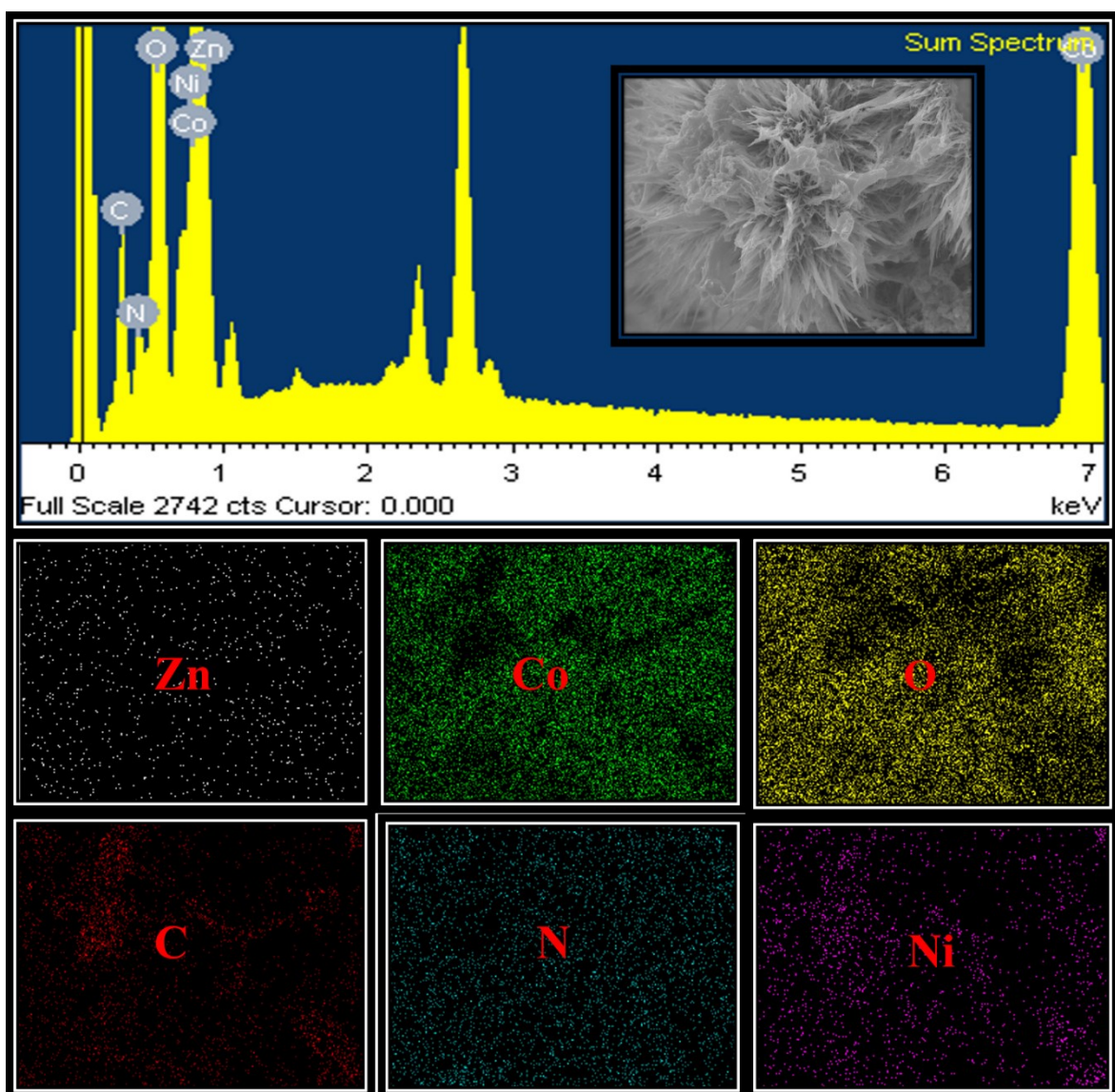


Fig. S2. EDS spectrum and elements mapping of ZGP-3.

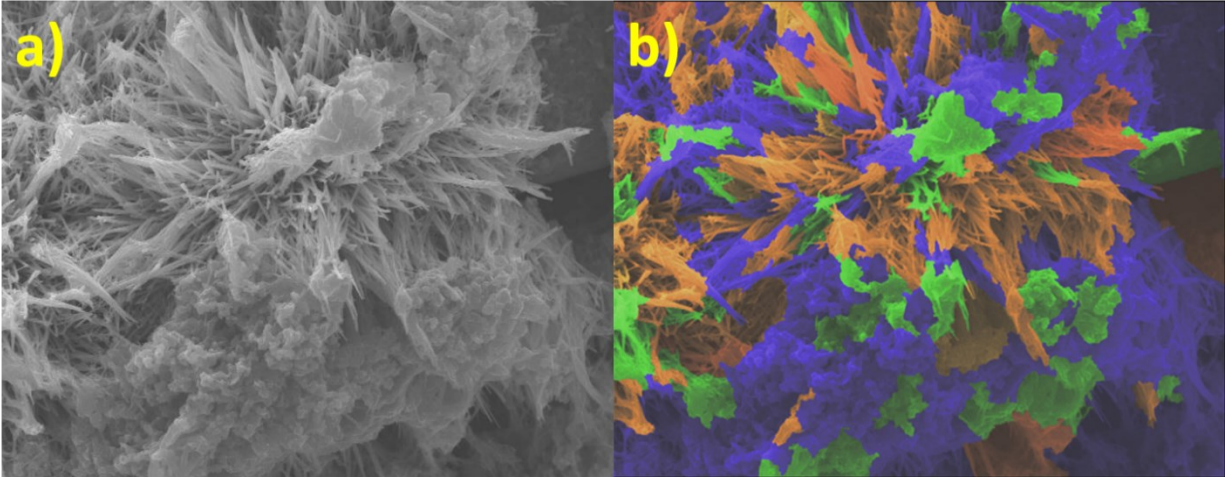


Fig. S3. (a) real SEM image of ternary composite (b) software processed color marked SEM image showing structured resemblance of ternary composite growth over nickel foam (ZnCo_2O_4 , PANI and $\text{g-C}_3\text{N}_4$ marked in brown, blue and green respectively)

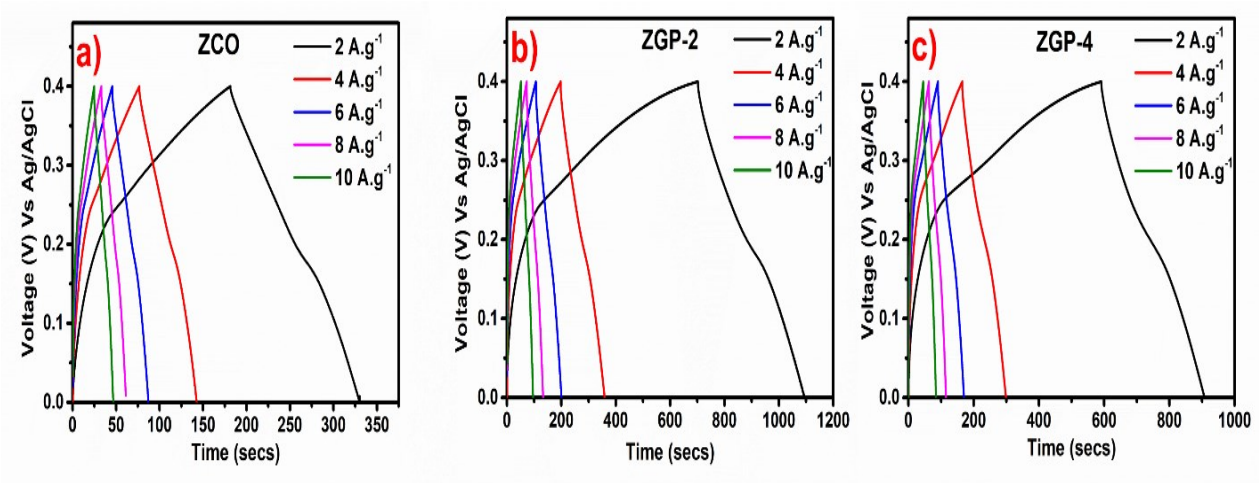


Fig. S4 (a-c). GCD plots of ZCO-based electrodes at various current density in the range of 2-10 A.g^{-1} .

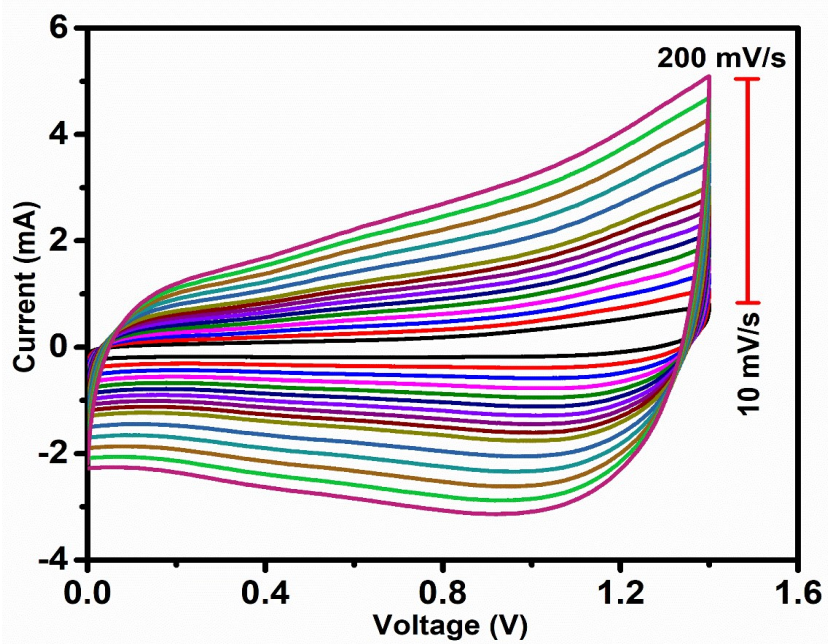


Fig. S5. Different scan rates of cyclic voltammetry curve for ZGP-3 assembled supercapacitor.