

15<sup>th</sup> International Conference and Exhibition on

# MATERIALS SCIENCE AND ENGINEERING

&

3<sup>rd</sup> International Conference on

# APPLIED CRYSTALLOGRAPHY

November 07-08, 2018 | Atlanta, USA

## Facile synthesis of Ni-doped ZnFe<sub>2</sub>O<sub>4</sub> nanoparticles supported on carbon black as an efficient electrocatalyst for oxygen reduction reaction in fuel cells

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**N**ovel nanocomposite system Ni-doped ZnFe<sub>2</sub>O<sub>4</sub> with carbon black was efficiently synthesized for oxygen reduction reaction (ORR) by a simple, scalable hydrothermal synthesis route. Face Centered Cubic (FCC) phase of the Ni-doped ZnFe<sub>2</sub>O<sub>4</sub> nanocomposite was confirmed by X-Ray Powder Diffraction (XRD) analysis. The average particle size is calculated at 20nm. The as-synthesized Ni-doped ZnFe<sub>2</sub>O<sub>4</sub>/C nanocomposite displays enhanced ORR catalytic performance than pure ZnFe<sub>2</sub>O<sub>4</sub>, ZnFe<sub>2</sub>O<sub>4</sub>/C and Ni-doped ZnFe<sub>2</sub>O<sub>4</sub>/C, which mostly favors a desired direct 4e<sup>-</sup> reaction pathway in the ORR. The improved electrocatalytic performance of the Ni-doped ZnFe<sub>2</sub>O<sub>4</sub>/C nanocomposite is ascribed to the doping of Ni atoms in zinc ferrite with carbon black, which affects the lattice parameter of crystal structure, particle size and specific surface area and the strong coupling of with carbon black.

### Biography

Maryam Kiani obtained her MPhil degree from National University of Science and Technology (NUST) Islamabad, Pakistan. She is currently doing PhD at College of Material Science and Engineering Sichuan University China and doing research on Energy Materials and Devices under the supervision of Prof Ruijin Wang. Her research is focused on the non-noble metal catalyst for fuel cells.

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