Nitrogen doped Carbon Nanotubes as Electrocatalyst for Oxygen Reduction Reaction

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The oxygen reduction reaction on nitrogen doped multiwalled carbon nanotubes (N-MCNTs) is studied for its application for deoxygenation of seawater. N-MCNTs were synthesized using commercial MCNTs and polyaniline as nitrogen precursor and annealing at a high temperature. The ORR was studied on N-MCNTs in 0.5 M sodium chloride solution using a rotating disk electrode, and physical characterization of the electrocatalysts was performed using X-ray diffraction, mass spectroscopy and transmission electron microscope techniques. The material showed high activity for the ORR in the chloride electrolyte. The onset potential for N-MCNTs was 0.94 V vs RHE. Koutecky-Levich analysis showed that the electrons transfer mainly followed the four-electron pathway, and the electrocatalyst showed good stability during a 15-h stability test.

Keywords: Seawater, Deoxygenation, Oxygen reduction, Carbon nanotubes.

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