

Iron nitride loaded nitrogen doped carbon nanotube and graphene composites as efficient electrocatalysts for oxygen reduction reaction

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The proton exchange membrane fuel cell (PEMFC) is a clean and high-efficiency device. PEMFC has low operating temperature and high power density. However, the dependence of platinum catalyst, high cost and novel metal, as well as a sluggish oxygen reduction reaction (ORR) at the cathode in PEMFC has become the greatest barrier to industrial application of PEMFC.

Recently, Pt alternative catalysts such as heteroatom-doped carbon and their coordinated metal catalyst are known to exhibit good electrocatalytic activity and durability. Iron nitride and N doped carbon composite has also been reported to be effective in enhancing ORR catalytic activity.

Herein, we describe Iron nitride loaded nitrogen doped carbon nanotube and graphene composites. Iron nitride exhibited improving electrocatalytic activity and durability towards ORR. CNT and GR hybrid composite is good electro catalyst support material. It is offered to high surface area and multiplex electron transfer pathways. Also, nitrogen doped carbon is supported to the Iron nitride distribution. Fe₂N/nCNT-GR hybrid is candidate to Pt alternative catalysts in fuel cell.