

Phosphorous-nitrogen dual doped carbon as an effective catalyst for oxygen reduction reaction in acidic media: Effects of the amount of P-doping on the physical and electrochemical properties of the carbon

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A new strategy for enhancing the oxygen reduction reaction (ORR) activity of carbon-based catalysts in acidic media is proposed and characterized: modification through the dual doping of nitrogen and phosphorous into the carbon. In the ORR, the onset potential of the prepared catalysts was 0.6 V (vs. Ag/AgCl) in 1 M HClO<sub>4</sub>. The N-doped carbon records -0.69 mA/mg of mass activity at 0.5 V (vs. Ag/AgCl), but additional P-doping results in more than fourfold increase of activity: -2.88 mA/mg. Moreover, additional P-doping also modifies the ORR pathway, as N-doped carbon induces more than 10 % of H<sub>2</sub>O<sub>2</sub>, but the P, N-doped carbon produced below 1 % of H<sub>2</sub>O<sub>2</sub> during the ORR.