

Bio derived Co<sub>2</sub>P Nanoparticles Supported on Heteroatom Doped Carbon Catalyst for Anion Exchange Membrane Fuel Cell

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The most important issue in the fuel cell, which can be a promising candidate as the next generation energy conversion system, is the oxygen reduction reaction (ORR). Until now, due to the relatively high ORR activity, Pt catalysts are predominantly used. However, the scarcity, high cost and unsatisfactory stability of Pt make it difficult for commercialization of fuel cell. In this work, we developed a nitrogen doped carbon supported Co<sub>2</sub>P nanoparticles (NBSCo) catalyst via eco-friendly and simple synthesis method using bean sprouts as a base material. NBSCo exhibits superior ORR activity and durability to commercial Pt catalysts in alkaline media. The value of the half-wave potential of NBSCo is 10 mV higher than that of commercial Pt/C. The excellent oxygen reduction activity is attributed to the synergistic effect of Co<sub>2</sub>P and N-doped carbon. Finally NBSCo was applied in anion exchange membrane fuel cell (AEMFCs). At the optimized MEA composition, the NBSCo exhibited the max power density of 172 mW cm<sup>-2</sup>. It is convinced to be sufficiently competitive performance and it has demonstrated the possibility to be applied to AEMFC systems.