

Formation of Highly active electrocatalysts for oxygen reduction from carbon dioxide

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We developed a facile method to synthesize boron-doped porous carbon (B-PC) using CO₂ as a carbon source and it was used as catalyst for oxygen reduction reaction (ORR) in fuel cell. As a way of improving the activity for Oxygen Reduction Reaction (ORR), the secondary heat-treatment was employed. Without any chemical treatment, only simple secondary pyrolysis showed significant enhancement for ORR. Also, to clarify existing B atoms in B-PC, B atom was leached by KOH activation method. As a result, it was confirmed that B, N heteroatoms on carbon have a great impact on ORR activity. Moreover, BN-doped porous carbon (BN-PC) was synthesized via pyrolysis of mixture of urea and B-PC. The resulting product exhibits superior ORR activity and tolerance to methanol crossover.