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Oxygen reduction reaction equation

Polymer electrolyte membrane fuel cells (PEMFC) and metal air batteries are considered green and efficient electrochemical energy equipment and both involve a reduction in oxygen in the cathode during the work of the device. Due to the slow reaction kinetics of ORR, it is considered a limiting factor of performance and to cope with this problem scientists are trying to introduce a low cost, highly durable and effective electrocatalyst for cathode-reaction. After the synthesis of the catalyst material, various electrochemical techniques are used to check the performance and durability of orr catalysts, including steady state polarization, cyclic voltammetry, rotary disc electrodes and disk electrode rotary ring. In PEMFC, water should be produced together with the heat of the transmission reaction of 4 electrons between oxygen, protons and electrons. Reported ORR catalysts may be classified as metallic platinum catalysts, platinum-free catalysts and metalless catalysts. 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