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The studies of oxygen reduction reaction for the direct carbon fuel cell

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The direct carbon fuel cell (DCFC) is a energy generation system converting the chemical energy of carbon directly into electricity by an electrochemical reaction of DCFC. There are three basic families of direct carbon fuel cells under development, distinguished by the type of electrolyte used (molten hydroxide, molten carbonate or solid oxygen ion conducting ceramic) as described. Molten hydroxide direct carbon fuel cell (MHDCFC) has some advantages such as low temperature, high ionic conductivity and so on. Oxygen reduction reaction for MHDCFC is very complicated, so we have researched it. The process of oxygen reduction reaction generates O^{2-} , $O^{2\cdot}$, $O\cdot$ and $OH\cdot$ which are difficult to search so that we must do some inferences. The reaction of the cathode for ORR is and its balance electrode potential is 1.23V. Learning the oxygen reduction reaction mechanism for MHDCFC and looking for an excellent catalyst is very important at present. Pt is the best catalyst for oxygen reduction reaction but it is expensive. Now our work electrode is monel alloy (Cu-Ni) that is high temperature and corrosion resistance. I will do some further researches in this area. We will use density functional theory and electrochemical test method to explore oxygen reduction reaction. I believe that the direct carbon fuel cell will have more space for development and benefit to a human in the near future.

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