The Gram-scale Preparation Process of Pt-Fe-Cu Ternary Ordered Catalyst for Application of PEMFC

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With the rapid development of science and technology, energy problems such as atmospheric pollution have also continued to occur, which has made the development and utilization of new energy sources a research hotspot in various countries around the world. Proton exchange membrane fuel cells are one of the fuel cells with the greatest potential for marketization. However, the high cost of Pt catalysts has become one of the important reasons hindering the widespread use of proton exchange membrane fuel cells. In this paper, PtFexCuy ternary ordered catalyst was prepared by impregnation-calcination method. The surface morphology and electrochemical performance of the catalyst were analyzed by XRD, TEM, ICP, CV, LSV and other methods. Among them, the ECSA of PtFe0.75Cu0.25 is 56.10g / m2, and E1 / 2 is 0.889 V vs. RHE, and the activity is best in three groups of different ratio of Fe and Cu catalysts. The self-made fuel cell can still stably maintain a power output of 300mW / cm2 in the high current density area of 600 ~ 800mA / cm2. Based on the above data and the relevant electron microscopy patterns, it is concluded that in this group of experiments, catalyst activity is best when Fe: Cu = 0.75: 0.25. The result of this gram-scale amplification experiment imply that the stability and practical application value of the gram-scale preparation process of this catalyst. Finally, the catalyst is assembled into a fuel cell for testing, which further illustrates the practical application value of this catalyst.

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