Development of a Highly Efficient 3D RuPdBi/NG Electro catalyst for Ethylene Glycol Oxidation in an Alkaline Media

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Palladium (Pd) based catalysts are being considered as one of the most attractive area of research among researchers in recent years. These catalysts are used in the alcohol oxidation in fuel cells, despite it results in not enough higher oxidation efficiency. Following this to improve the efficiency changes in the structure of the catalyst and improving the loaded metal seem to be a reasonable approach. In this investigation, design and synthesis of a three-dimensional nitrogen-doped graphene (3D-NG)-loaded with palladium, ruthenium and bismuth have been proposed. The resultant three-dimensional structure provides a larger surface area, meanwhile, the synergistic effect of RuPdBi/NG tri-metal catalyst promotes the electro-oxidation rate of ethylene glycol. The catalytic activity of palladium layer in the catalyst was enhanced owing to the surface modification and electronic effect. The cyclic voltammetry and chronoamperometry techniques showed that 3D RuPdBi/NG has a higher catalytic activity and durability than the commercial Pd/C, 3D Pd/NG and 3D RuPd/NG.

Keywords: SiO2 temple; Nitrogen-doped graphene; tri-metallic catalyst; ethylene glycol electro-oxidation; application possibility.

FULL TEXT

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