## Oxidation Activity of Platinum-Ruthenium-Tin Ternary Alloy Catalyst on Bio-Alcohol

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**Abstract :** In this study, the ternary alloy catalyst Pt20RuxSny (where 20, x, y represent mass fractions of Pt, Ru, and Sn, respectively) was optimized for the preliminary study of bio-ethanol fuel cells (BAFC). The morphology, microstructure, composition, phase-structures, and electrochemical properties of Pt20RuxSny catalyst were examined by SEM, TEM, EDS-mapping, XRD, and potentiostat. The effect of Sn content on electrochemical active surface (EAS) and oxidation activity were discussed. As a result, the additional Sn greatly improves the efficiency of Pt20RuxSny, either x=0 or 10. Through discussing the difference between ethanol and glycol oxidations, the mechanism of tolerance against poisoning has been proved. Overall speaking, the catalytic activity are in the order of Pt20RuxSny > Pt20Rux > Pt20Sny in both ethanol and glycol systems. Finally, Pt20Ru10Sn15 catalyst was successfully applied to demonstrate the feasibility of using bio-alcohol.

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Keywords : Pt-Sn alloy catalyst, Pt-Ru-Sn alloy catalyst, fuel cell, ethanol, ethylene glycol

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