

Electro-oxidation of formic acid in alkaline medium on PdAu/C-Sb₂O₅·SnO₂ electrocatalysts prepared by borohydride reduction

Julio Nandenha, Mônica Helena Marcon Teixeira Assumpção, Júlio César Martins Silva, Estevam Vitorio Spinacé, Almir Oliveira Neto

e-mail: jnandenha@gmail.com

Pd/C-Sb₂O₅·SnO₂ and PdAu/C-Sb₂O₅·SnO₂ electrocatalysts with different PdAu atomic ratio (90:10, 70:30 and 50:50) were prepared by borohydride reduction method and characterized by X-ray diffraction and electrochemical studies (chronoamperometry). X-ray diffraction showed for Pd/C-Sb₂O₅·SnO₂ the presence of Pd face-centered cubic (fcc) system, while for PdAu/C-Sb₂O₅·SnO₂ it showed the presence of Pd fcc phase, PdAu fcc alloys and a segregated phases fcc Pd-rich and Au-rich phases. The electrochemical studies showed that PdAu/C-Sb₂O₅·SnO₂ (50:50) had superior performance for formic acid electro-oxidation in alkaline medium compared to others electrocatalysts prepared. These results indicated that the addition of Au to Pd favor the electro-oxidation of formic acid in alkaline medium, where this effect could be attributed to the synergy between the constituents of the electrocatalyst or to electronic modification of Pd as the proximity of Au and Pd atoms on the surface of the C-Sb₂O₅·SnO₂ (bifunctional mechanism).

References

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