

Anodic electro-oxidation of alcohols using carbon-supported Pt based electrocatalyst for direct alcohol fuel cells (DAFCs)

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Fuel cells employing alcohols directly as fuel – direct alcohol fuel cell (DAFC) – are attractive as power sources for mobile, stationary and potable applications. The alcohol is fed directly into the fuel cell without any reforming process to extract H₂ and is oxidized at the anode while oxygen is reduced at the cathode. This feature avoids problems related to production, purification and storage of hydrogen[1]. However, alcohols' complete oxidation to CO₂ is difficult due to the difficulty in C-C bond breaking and to the formation of CO-intermediates that poison platinum anode catalysts. It is well known that the catalytic activity of the metal is strongly dependant on particle shape, size and size-distribution[2].

In this study, we examine electrochemical oxidation properties of various alcohols (e.g. methanol, ethanol) using the cyclic voltammetry (CV) over different carbon supported Pt based catalysts whose structure was investigated by X-ray diffraction (XRD).

References

- [1] B.C.H. Steele, A. Heinzel, Nature 414 (2001) 345
- [2] W. Vielstich, A. Lamm, H. A. Gasteiger, Handbook of Fuel Cell, Willey Press, 2003