Electrocatalysts for Electrooxidation of Methyl Formate

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Methyl formate is a kind of ester containing methaolic and formate component. Methyl formate can be produced by a variety of routes using a number of feed stock and it's easy to handle, store and transport. In addition it has comparable volumetric charge density to methanol. Therefore methyl formate can be an alternative fuel for fuel cell. Methyl formate is decomposed to methanol and formic acid by hydrolysis. So we prepared Sn containg catalyst (PtSn/C) and Pd containing catalyst (PtPd/C), then compared their activity for electrooxidation of methyl formate to commercial catalysts from E-TEK (Pt/C, PtRu/C). Pt_1Sn_1/C and Pt_1Pd_1/C catalysts were easily prepared by chemical reduction with hydrothermal treatment method and their properties were analyzed by XRD and TEM. Mean particle size of Pt_1Sn_1/C was 2.1nm and Pt_1Pd_1/C was 2.8nm by TEM. Electrochemical activity of methyl formate was performed by CV. Pt_1Pd_1/C catalyst showed higher mass activity than commercial catalysts in low potential region (below 0.4V vs Ag/AgCl), possibly due to dominant reaction of formic acid than methanol produced by hydrolysis of methyl formate.