

119c Formic Acid Electro-Oxidation by Pd: Particle Size Effects

Robert T. Larsen, Weiping Zhou, Andrzej Wieckowski, and Richard I. Masel

Formic acid fuel cells (FAFCs) are well suited to power small, portable devices and microelectromechanical systems (MEMS). Recently discovered Pd based catalysts for formic acid oxidation have resulted in dramatic performance improvements allowing power densities of over 125 mW cm⁻² at 0.7 V in a passive air breathing fuel cell, making it practical to power many small, power and energy intensive devices with FAFCs. These Pd catalysts demonstrate an interesting particle size effect in that the catalyst becomes more active on a per Pd atom basis as the particle size decreases. It is important to understand why this particle size effect occurs to optimize catalyst performance. Various data including XPS, TEM and electrochemical studies offer some insights into why this size effect may occur.