

Design, construction and research application of a Differential Electrochemical Mass Spectrometer (DEMS)

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Abstrak

Sean Ashton's doctoral thesis, describes the challenge of constructing a Differential Electrochemical Mass Spectrometer instrument (DEMS). DEMS combines an electrochemical cell with mass spectrometry via a membrane interface, allowing gaseous and volatile electrochemical reaction species to be monitored online. The thesis carefully introduces the fuel cell electrocatalyst development concerns before reviewing the pertinent literature on DEMS. This is followed by the presentation and discussion of the new extended design, including a thorough characterization of the instrument. The capabilities of the new setup are demonstrated in two research studies, the methanol oxidation reaction on Pt and PtRu catalysts, and the electrochemical corrosion of fuel cell catalyst supports.