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## Manufacturing of Direct Methanol Fuel Cell Electrodes by Spraying

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### Abstract

Spraying is a well-established coating process used to fabricate electrodes for both PEMFC and DMFC fuel cells, and also for the fabrication of gas-diffusion media (GDM) used in fuel cells (1–7). Despite its popularity as a process there is little basic research on how spray parameters and nozzle characteristics affect the drop sizes of catalyst inks, and how those droplet sizes, affect the electrode structure, porosity, conductance and eventually the overall MEA performance. We present results from an experimental study to systematically answer these questions, characterizing the spray nozzle and measuring drop diameters, and then investigating the microstructural effects on electrode performance. For this purpose, first a spraying apparatus was developed and calibrated, and MEA's were fabricated with fixed electrode loadings but with different droplet sizes. Droplet sizes were controlled by characterizing the spray nozzle and measuring the spray by two methods, optically by utilizing high-speed photography and by the hot wire method (8–12).

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