

## Nafion Nanofiber Mat in a Single Fuel Cell Test

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**Abstract :** Proton exchange membrane, PEM was developed and tested for potential application in fuel cell. Nafion was electrospun to nanofiber network with the aid of poly(ethylene oxide), PEO, as a carrier polymer. The matrix polymer was crosslinked with Norland Optical Adhesive 63 under UV after compacting and annealing. The welded nanofiber mat was characterized for morphology, proton conductivity, and methanol permeability, then tested in a single cell test station. The results of the fabricated nanofiber membrane showed a proton conductivity of 0.1 S/cm at 25 oC and higher fiber volume fraction; methanol permeability of  $3.6 \times 10^{-6}$  cm<sup>2</sup>/s and power density of 96.1 and 81.2 mW/cm<sup>2</sup> for 5M and 1M methanol concentration respectively.

**Keywords :** fuel cell, nafion, nanofiber, permeability

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