Optimizing the Performance of Pt, Pd and Nickel-based Electrocatalysts in Anion Exchange Membrane Fuel Cells

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Goal: To optimize performance of fuel cells in alkaline media by changing varying parameters such as soaking, temperature, ionomers used, etc.

Methods

Ink Deposition / CCM Production

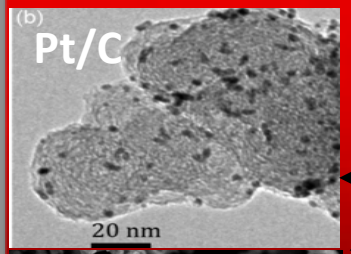
Catalyst, Ionomer, & IPA ball milled for 1 hour

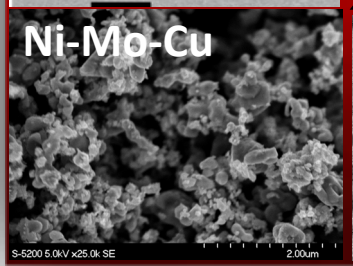
Soaking Phase

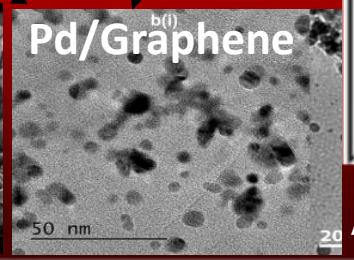
- 3M KOH 1 hour → rinse and soak in DI Water
  or
  0.5M KOH 24 hours → Rinse and soak in DI Water

MEA Assembly

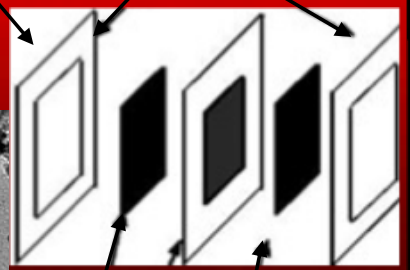
- Gaskets, GDLs, and sprayed CCM assembled and pressed ½ metric ton 1 minute







Different Catalysts Used



Conclusions:

By testing MEAs in the test station, results show that soaking is better than circulation, optimal temperature in alkaline media is 60°C, and best ionomer performance results from 20% FAA-3 deposited on anode and 20% MH deposited on cathode.

Future Work:

NiMo catalysts deposited on the anode showed promising potential. This project will carry on investigating the power density created by these types of catalysts.

Results