Abstract Submitted
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Incorporation of Platinum and Gold Partially Reduced Graphene Oxide in Polymer Electrolyte Membrane Fuel Cells for Increased Carbon Monoxide Tolerance[1] LEE BLACKBURN, REBECCA ISSEROFF, MIRIAM RAFAILOVICH, State Univ of NY- Stony Brook, JAYMO KANG, University of California, Berkeley , HONGFEI LI, MOLLY GENTLEMAN, State Univ of NY- Stony Brook, QAIO QAIO, Brookhaven National Laboratory — Polymer Electrolyte Membrane Fuel Cells (PEMFCs) can potentially provide "green" energy but the platinum catalyst's susceptibility to carbon monoxide (CO) poisoning reduces output power. This project hypothesized that gold and platinum-partially reduced graphene oxide (Au/Pt-prGO) catalysts, incorporated into the electrodes and Nafion membrane of a PEMFC, will increase CO tolerance. Aliquots of graphene oxide (GO) were functionalized with platinum and/or gold nanoparticles. Partial reduction with $NaBH_4$ prevented precipitation. Raman Spectroscopy and HRTEM verified the chemical identity, structure, and presence of the materials. Setups were tested in a PEM fuel cell with a gas feed containing 1000 ppm of CO, and averaged an output power >200% over the control, with the most effective sample, Pt-prGO Electrode + Membrane, yielding an output power ˜250% greater than the control. Additionally, each setup's poisoned output power (P_P) was compared to its highest possible output power (P_M). AuPt-prGO Electrode + Membrane produced 100% of its highest possible output power when poisoned, displaying 100% resistance to all CO poisoning at the resistances tested.

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