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MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Experiments from Sub-Orbital to Orbital Platforms (3)

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MICROGRAVITY EFFECTS ON CHRONOAMPEROMETRIC AMMONIA OXIDATION AT PLATINUM NANOPARTICLES ON MODIFIED MESOPOROUS CARBON SUPPORTS

Abstract

The effects of microgravity on the electrochemical oxidation of ammonia at platinum nanoparticles on modified mesoporous carbons (MPC) with three different pore diameters, e.g. 64, 100, and 137 A was studied via chronoamperometric technique. A microgravity environment was obtained with an average gravity of less than 0.02gs created aboard an airplane performing parabolic maneuvers. Results show that the oxidation current density on all three catalysts decreased while in microgravity conditions when compared to ground based experiments. It was demonstrated that in a microgravity environment a porous infrastructure for a catalyst support has an impact on the mass transfer process of electroactive species, and a current density decreasing factor of ca. 51 – 66% must be taken into account. Furthermore, it was shown that the oxidation current does not immediately improves after a transition from microgravity to hypergravity conditions. A thorough physical characterization of the synthesized supported catalyst was conducted to sustain all findings.