National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Analysis of current density and hydrogen consumption in PEMFC
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Venue	: ME212, Mechanical Sciences
Date and Time	: 03 Oct 2024 (10:00 AM)
Abstract	: Proton Exchange Membrane Fuel Cells (PEMFCs) can operate at low temperatures for rapid start-up. In this study, mathematical equations used for the single-cell PEMFC are solved for the counter flow arrangement. A three-dimensional, isothermal, and steady-state with a single-phase model is engaged to calculate the current flux density and the hydrogen consumption at different locations of the inlet of the fuel cell. The model solved the gas species distribution in a fuel cell. The acquired polarization curve is related to the reference model. Results indicated that for a high consumption of hydrogen, more current flux density is attained and for less consumption of hydrogen less current flux density is attained. When the temperature of the PEM fuel cell is increased by the electrochemical equations voltage increases so the current achieved decreases. The results indicate that at a temperature of 343K and at 0.7V, 0.8V and 0.9V mass fraction of hydrogen varies from 0.8 to 0.71, 0.8 to 0.734 and 0.8 to 0.773 respectively with respect to varying the distance of the inlet of the fuel cell to the outlet from 0 to 60 at a regular interval of 10mm.