

THE FUEL CELL AIR ELECTRODE

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ABSTRACT

The development of fuel cells for ground power applications requires detailed analysis of the dynamic behavior of air cathodes operating at atmospheric pressure and variable conditions (temperature, relative humidity). For low power levels, systems considerations such as simplicity of operation, low parasitic power requirements, safety, etc., are to a large extent related to the air electrode. Immobilized and poly-electrolytes (ion exchange membranes) offer advantages such as: support for electrodes and barrier between reactant gases, no special requirements for well-defined electrode pore geometries and population, mechanical integrity, etc.

The ion exchange membrane air electrode is rather well suited for operation under conditions of natural convection. This approach results in a complete system without moving parts, thus in absence of parasitic power requirements. Recent work in these air electrodes has been directed towards solutions of simultaneous heat and mass transfer problems to achieve proper water management and yield quasi-uniform electrode surface conditions.