

SIMPLIFIED FUEL CELL SYSTEMS FOR ARMY APPLICATIONS

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ABSTRACT

Fuel cells using a variety of fuels and air as oxidant have been built in technically feasible prototypes. Before they can gain acceptance for commercial or military markets many refinements must be made to provide extended, low maintenance, customer operation and to greatly reduce fabrication and materials costs. System redesign and simplification to use a minimum of components to perform the minimum required functions is the key to this objective. The Army has found use for those fuel cells which use air and solid or liquid chemical forms of the active hydrogen fuel. Highly simplified configurations of lithium hydride, hydrazine and hydrocarbon fueled fuel cells are being developed. Use of batteries in hybrid battery-fuel cell systems and sensitive fuel feed controllers have eliminated the need for costly and heavy electronic power conditioning, has reduced the number of moving parts, and greatly reduced the size and power required for special startup systems. The system "simplicity" of a 30 watt metal-hydride-air, a 60 watt hydrazine-air and a 500 watt hydrocarbon-air system will be examined in detail.