

RESEARCH, DEVELOPMENT AND DEMONSTRATION OF A NICKEL-IRON BATTERY FOR ELECTRIC VEHICLE PROPULSION

Westinghouse Electric Corporation, R&D Center, Pittsburgh, PA 15235 (U.S.A.)

The objective of this contract is to develop an advanced iron-nickel battery, capable of meeting the near term (1980) battery performance and projected cost goals for electric vehicle propulsion, as defined by DOE/ANL. Principally, these 1980 properties include 60 W h/kg, 100 W h/l, 100 W/kg peak power, >60% energy efficiency, <\$60/kW h.

Full size bench test cells have been constructed, using molded design cases and covers, that demonstrate the feasibility of attaining 50 - 60 W h/kg, at the C/3 drain rate, at target cell weight, and in the design volumetric constraint. Similar cells, having molded cases and covers, and employing electrolyte circulation, have been fabricated and are being used to establish cyclic life at the 80% DOD testing regime. Inherent in the attainment of the full size cell test goals are significant technical and process advancements in the plaque, the nickel electrode, the iron electrode, the separator system, and the terminal post assembly design.

About 180 cells have been fabricated in the pilot line, qualified for performance capability, and assembled into a 16 module full size battery. This will receive in-vehicle testing at JPL. Concurrently, a similar module has been delivered to ANL for test evaluation in the NBTL facility. Yet to be demonstrated is long cycle life performance of the full-size test cells. These tests are just underway. They were delayed until the proper finished molded cases and covers which permit electrolyte circulation (for thermal control and gas management) could be obtained.

Plans for the last quarter of 1979 and for 1980 include the following: continued development of low cost manufacturing methods for nickel electrodes, completion of modules and batteries for testing at NBTL, and determination of life characteristics at various depths of discharge.

Recent publications

- 1 W. Feduska and R. E. Vaill, in S. Gross (ed.), *Design of an iron-nickel battery for electric vehicles, Proc. Symp. Battery Design and Optimization, The Electrochemical Society, 79-1 (1979) 299 - 310.*
- 2 Westinghouse, Annual Status Report for FY78, Contract No. 31-109-34-4141, 8/31/78 (to be issued).