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Shelf and Cycle Life Evaluation of Silver-Zinc Cells

Failure of silver-zinc battery cells is often caused by corrosion of the casing and electrode-separator materials. A study of the shelf life and recharge capabilities of silver-zinc cells subjected to thermal sterilization treatments has revealed one type of separator material which, although not perfect, is superior to other materials currently used in its ability to withstand corrosion.

Sterilized and control silver-zinc cells with 5 different separator systems were given extended shelf and cycle life tests. Only 6 of the 23 cells remained on the divalent silver-zinc upper-voltage plateau of 1.84-1.85 V for 12-20 months at room temperature. Upon discharge following the storage period, only unsterilized control cells with a separator system of cross-linked high-density polyethylene with a methacrylic acid graft delivered capacities comparable to their initial capacities.

The cells were given several 100% depth-of-discharge cycles and placed back in storage for 4.5 months. Then these cells were cycled daily (discharged to 1.00 V at 9.0 amp and charged to 2.10 V at 2.0 amp) for 80 cycles without shorting.

The data showed that the open-circuit voltage cannot be used to predict the capacity of a silver-zinc cell; however, if the open-circuit voltage of a cell drops below 1.58 V, the cell is shorted and cannot be rejuvenated.

Notes:

1. Additional information on silver-zinc cells may be found in "Batteries for Space Power Systems", by Paul Bauer, NASA SP-132, 1968, for sale by the U.S. Government Printing Office, Washington, D.C. 20402; price $1.50.
2. Requests for further documentation may be directed to:

   Technology Utilization Officer
   NASA Pasadena Office
   4800 Oak Grove Drive
   Pasadena, California 91103
   Reference: TSP70-10214

Patent status:

Inquiries about rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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