

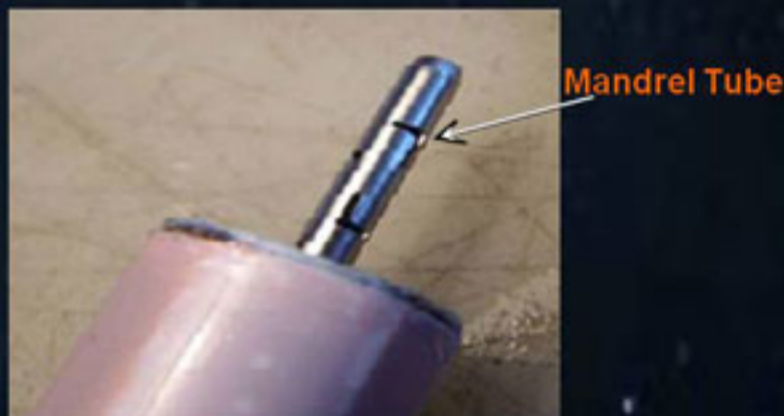
Global Precipitation Measurement (GPM) mission project support/ life test battery characterization

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INTRODUCTION

Lithium-ion batteries are among the most advanced rechargeable batteries available, making them very popular for various applications. A lithium-ion rechargeable battery provides high volumetric and gravimetric energy densities compared to other rechargeable batteries. The battery manufacturer ABSL selected the Sony Lithium 18650 HC cell in the late 1990's to make their space qualified cells.



Mandrel Tube

Figure 1: Mandrel tube inside SONY 18650 Hard Carbon Cells

NASA Goddard Space Flight Center used ABSL batteries built from SONY 18650 HC cells on ST-5, SDO and LRO missions. Recently, SONY made modifications to these cells due to failures in terrestrial applications. The addition of a mandrel tube is supposed to "improve the vent path within cell to the safety vent" without causing any changes in the performance of the cell and the built-in safety features.¹



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PURPOSE

Establish the baseline characterization of the life-test batteries, which the contractors at the Naval Surface Warfare Center at Crane, Indiana will use to compare later performance tests of the SONY 18650 HC and SONY 18650 HC mandrel cells

DESCRIPTION OF BATTERY PACKS

- The study was performed on ABSL 13 Ah lithium-ion (Li-ion) batteries.
- Testing was performed as a battery pack of 104 SONY Hard Carbon Cells in an 8s13p configuration (8 cells in series and 13 in parallel). Figure 2 & 3

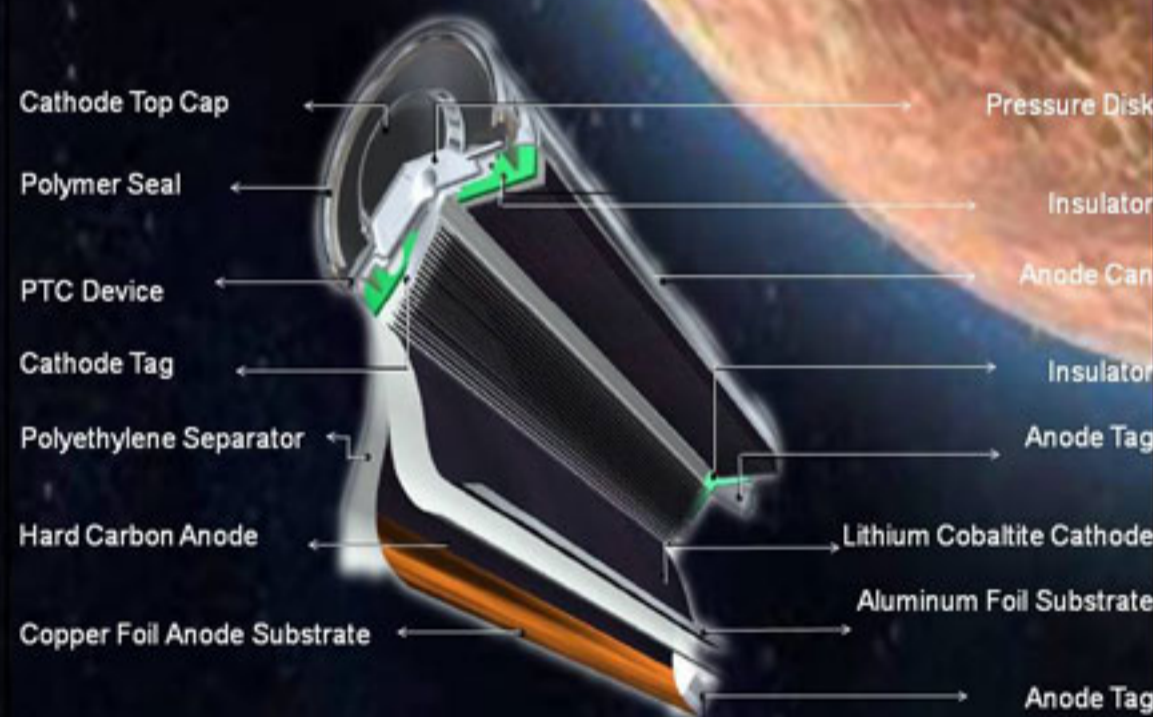


Figure 2: Schematic of SONY 18650 Hard Carbon Cell



Figure 3: Battery packs tested at NASA Goddard Space Flight Center

RESULTS & DISCUSSION

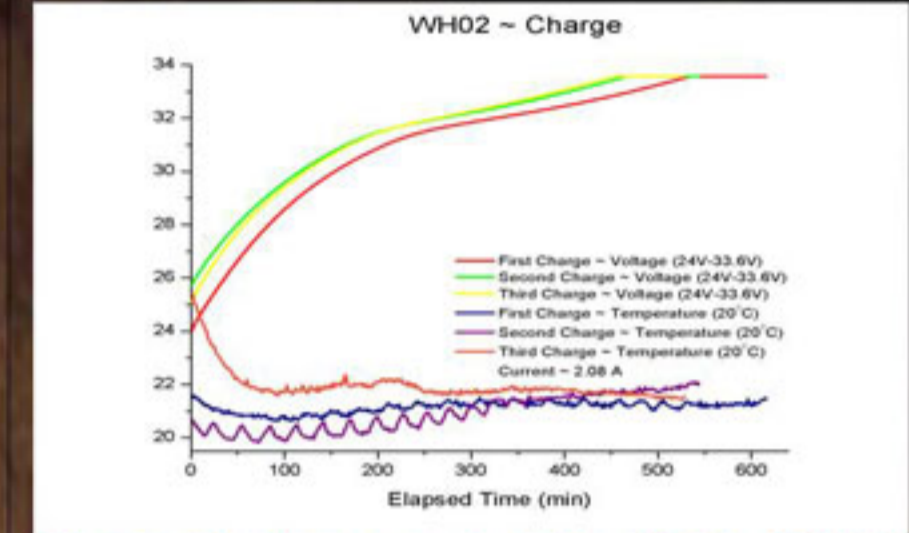


Figure 5: Charge curves for ABSL SONY 18650 Hard Carbon Cell 8s13p

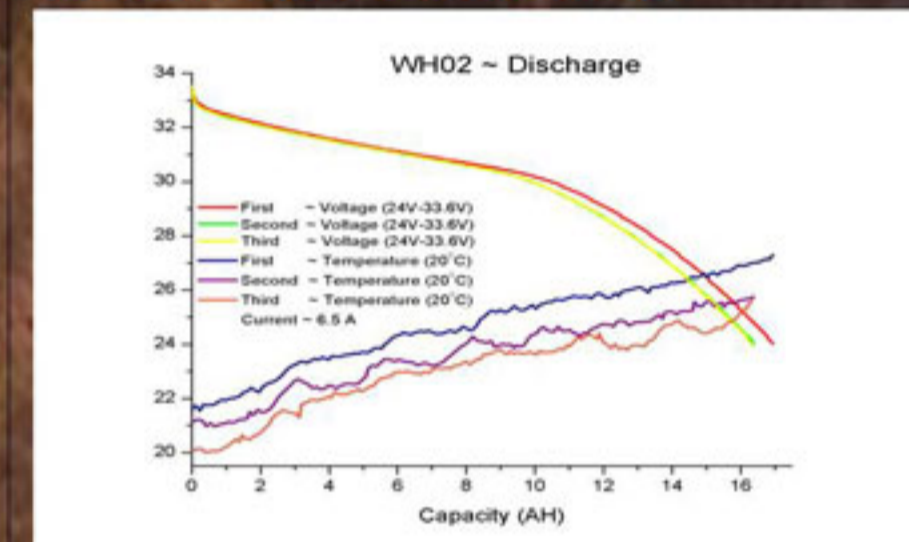


Figure 6: Discharge curves for ABSL SONY 18650 Hard Carbon Cell 8s13p

The characterization allow us to corroborate that performance of ABSL battery pack using SONY 18650 HC cell was as usual.

The capacity found was approximately 16Ah for two samples of 8s13p SONY 18650 HC battery pack.

SUMMARY & FUTURE WORK

Due to limited time we were able to characterize only ABSL SONY 18650 HC space qualified battery pack.

In a future we need to verify that the mandrel tube added to the cells are not going to be a safety issue for future NASA missions

REFERENCES

- "ABSL Performance Comparison SONY 18650 Hard Carbon Cell and SONY 18650 Hard Carbon Mandrell Cell" by Joe Troutman

ACKNOWLEDGMENT

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