

## DISASSEMBLY OF IRRADIATED LITHIUM-BONDED CAPSULES CONTAINING VANADIUM ALLOY SPECIMENS\* H. Tsai and R. V. Strain (Argonne National Laboratory)

### SUMMARY

Capsules containing vanadium alloy specimens from irradiation experiments in FFTF and EBR-II are being processed to remove the lithium bond and retrieve the specimens for testing. The work has progressed smoothly.

### OBJECTIVE

Vanadium alloy specimens in lithium-bonded capsules were irradiated in FFTF MOTA-2B, and in EBR-II COBRA-1A and X530 experiments. The objective of this task is to disassemble the capsules from these experiments in order to retrieve the irradiated specimens.

### OUTLINE OF PROCESSING METHOD

Although the vanadium alloy specimens are low-activation and generally do not pose a significant radiological hazard after irradiation, the capsules holding the specimens often do. Therefore, the work is being conducted remotely in an alpha-gamma hot cell. The ventilated atmosphere of the hot cell also minimizes personnel exposure from the small quantities of tritium generated in the (n,T) reactions with  ${}^6\text{Li}$ .

Opening of the capsule is done with a tubing cutter, at one or both ends. Amounts of tritium released are monitored, but have always been well within the allowable exhaust limits of the hot cell. The entire content of the opened capsule is placed in a stainless-steel wire mesh basket and immersed in a beaker containing liquid ammonia. Dissolution of lithium in liquid ammonia takes hours to days, depending mainly on the specimen packing inside. Following the ammonia dissolution, the specimens, still in the wire-mesh basket, are rinsed several times in clean alcohol baths. An ultrasonic cleaner is sometimes used to accelerate the cleaning process. The used ammonia and alcohol are allowed to evaporate and the dried residues are disposed of as wastes.

The cleaned specimens are visually inspected and counted through the hot cell window, then sorted and placed in clean vials and removed from the hot cell. A survey is conducted immediately before the vials are removed from the hot cell facility.

### STATUS

In this reporting period, all remaining MOTA-2B and COBRA-1A1 capsules were processed. These capsules are V492, V493, V494, V572, V676, and V677 from the MOTA-2B experiment, and V4101 from the COBRA-1A1 experiment. Specimens that belong to Monbusho were packaged and shipped to Japan.

Processing of the capsules removed from the X530 experiment has begun. Thus far, capsules S1, S2, and S3 have been completed.

### Future Activities

Work is continuing on processing the remaining nine capsules from the X530 experiment. Capsules from the COBRA-1A2 experiment, which is being disassembled at PNL, will be scheduled when they become available.

Additional specimens are being irradiated in the ATR-A1 experiment in the Advanced Test Reactor and in the Fusion-I experiment in the BOR-60 reactor. Both experiments are expected to be completed in the second quarter of 1996. A commitment has been made to collaborate with Russian colleagues to process the completed Fusion-1 experiment at RIAR, Russia.

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