UNCLASSIFIED

AEC U-2744

Wo-38385

Discussion of "The System Zirconium-Aluminum" by
D. J. McPherson and M. Hansen

Discussion by: J. H. Keeler

AECU-2744

The authors are to be complimented on the presentation of a carefully-prepared and very useful piece of work. We have carried out a number of experiments under AEC Contract W-31-109-Eng-52 on alloys in the zirconium-rich portion of the system and have found the diagram worked out by the authors to be very helpful.

The authors' Figure 21 shows a pearlitic breakdown of Zr_5Al_3 in an alloy containing 13.5 weight per cent or 34.5 atomic per cent aluminum. We have frequently found evidence of a lamellar structure, believed to be precipitated Zr_3Al , in alloys containing approximately 10 atomic per cent (3 weight per cent aluminum). This structure was absent in specimens quenched from above or from just below the α - β transformation temperature. On the other hand, very slow cooling from these same temperatures produced the lamellar precipitate, as shown in our Figure 1. Often, the precipitate started from grain boundaries, as shown in Figures 2 and 3.

It has also been observed that the first compound, Zr_3Al , is ductile at and above 800-850°C, since alloys hot rolled at these temperatures when examined metallographically exhibited elongated particles of this compound. The length-to-thickness ratio of some of these elongated particles was greater than 4 to 1.

UNCLASSIFIED

This report has been photostated to fill your request as our supply of copies was exhausted. If you should find that you do not need to retain this copy permanently in your files, we would greatly appreciate your returning it to TIS so that it may be used to fill future requests from other AEC installations.

6906-1

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Figure 1.

Zirconium alloy containing 12 atomic
per cent aluminum

Cooled slowly from 900°C

1000 mag.

Bright Field Illumination

Figure 2.

Zirconium alloy containing 10 atomic
per cent aluminum

Cooled slowly from 960°C

250 mag.

Bright Field Illumination

Figure 3.

Same as Figure 2.

750 mag.

6906-2

1-2

THIS PAGE
WAS INTENTIONALLY
LEFT BLANK

U. S. ATOMIC ENERGY
COMMISSION
WASHINGTON, D. C.

1953 OCT 30 AM 8

RECEIVED