

METHODS FOR ANALYZING METAL TRITIDES IN THE X-RAY DIFFRACTION LABORATORY

Ralph Tissot and Michael Eatough
Sandia National Laboratories
Materials Characterization Dept. 01822
Albuquerque, New Mexico 87107

Hydrogen and its isotopes, protium, deuterium and tritium, are often stored as metal hydrides. X-ray diffraction is used to study the crystallographic characteristics of the metal hydrides and their relationship to substrate materials. In the case of tritium a unique set of challenges are presented for sample preparation, data collection and interpretation, as well as contamination abatement in and around the x-ray instrumentation. This paper will describe a simple sample holder that allows phase identification, residual stress and pole figure analysis of metal tritides, with both minimal waste and contamination. Discussion of the training requirements and ALARA practices to insure no contamination to the x-ray equipment and surrounding areas, as well as what to do if contamination occurs. Several examples showing the methods used for sample alignment and data interpretation are also discussed.

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