Electrical Resistivity Studies of Order-Disorder Phenomena in V2H and V2D

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(TSH) in these bcc alloys. The TSH's, which are marked by the onset of hydride precipitation from the saturated solid solution, were determined resistometrically from discontinuities in \( \rho(T) \). Increases in the apparent parameter (TSH) were not believed to be due to the presence of energetically favorable interstitial sites, or "traps", in the vicinity of the substitutional Ti solute atoms.

The magnitude of the TSH enhancements suggests that Ti is a more effective trapping center than Ta, but less effective than V. Proposed explanations for this behavior based upon electronic and atom-size considerations will be discussed.

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KJ 6 Electrical Resistivity Studies of Order-Disorder Phenomena in V2H and V2O. G. BARKAKIDIS and M. W. PERSHING Wright State University, and R. C. BOWMAN, JR., Mound Facility**.--There is a marked isotope effect in the KJ 6 Electrical Resistivity for cate a second-order transition within the LRO closely with that inferred from powder neutron diffraction measurements. For *Supported by USDOE through Mound Co-op Program. **Supported by Monsanto Research Corporation for the LRO parameter agrees closely with that inferred from powder neutron diffraction measurements. For V2O the results indicate a second-order transition within the B phase before the onset of the B phase. The LRO parameter agrees closely with that inferred from powder neutron diffraction measurements. For V20 a first-order \( \gamma \alpha \) transition is indicated. Our LRO parameter in this case differs significantly from the neutron diffraction results but agrees well with that inferred from X-ray diffraction. *Supported by USDOE through Mound Co-op Program.

KJ 7 X-dependent Optical Studies of LaHx. D. J. PETERMAN, D. T. PETERSON, Ames Laboratory-USDOE* and J. H. WEAVER, Synchrotron Radiation Center, University of Wisconsin-Madison.—Optical absorptivity experiments in the photon energy range of 0.2-4.5 eV for various concentrations of hydrogen in CaF2-structured LaHx have been performed. The measured quantities were used to determine the frequency-dependent dielectric functions. The results have been interpreted in light of previous experimental and theoretical studies of the electronic structure of ScH2 and YH2. Based on the results of that earlier work, one would expect hydrogen to occupy a substantial number of octahedral sites in LaH2—perhaps giving rise to 'new' interband transitions. Such transitions have been observed and their concentration dependence allows us to classify the observed interband transitions as to whether or not they arise from octahedral site occupation.

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KJ 8 Sample Shape-Dependent Phase Transition of Hydrogen in Ti. H. ZABEL, University of Houston*, H. PETSL, University of Munich**.—The \( \alpha \) \( \gamma \) phase transition of hydrogen in Niobium closely resembles a gas-liquid transition of a real gas. The hydrogen atoms interact mainly via the long range elastic distortion field of the host metal atoms. The theory of elastic interaction and phase transition in coherent metal-hydrogen systems predicts strongly depressed critical fluctuations at the critical point (\( T_c = 0.31 \) K/Nb, \( T_c = 171^{\circ}C \)). Only a few modes become unstable below \( T_c \) on isochoral cooling of Nb samples, after in situ loading with hydrogen above \( T_c \). It will be shown by means of X-ray scattering that these modes vary macroscopically over the whole sample size. The density modes depend sensitively on the sample geometry due to the fulfillment of the elastic boundary condition. Coherent hydrogen fluctuations are observed down to 40 degrees below \( T_c \).

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