Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Anelastic Spectroscopic Studies of Point Defect Dynamics and Evolution of Chemical Reactions in Alanates** CRAIG JENSEN, University of Hawaii, Manoa, ROSARIO CANTELLI, ORIELE PALUMBO, ANNALISA PAOLONE, Universitá di Roma "La Sapienza", SESHA SRINIVASAN, MARTIN SULIC, University of Hawaii, Manoa — As part of our effort to characterize the active species in Ti-doped $NaAlH_4$ and elucidate its mechanism of action, we have carried out the first measurements of elastic modulus and energy dissipation in Ti-doped and undoped sodium aluminium hydride. We have found that the dehydrogenation of the hydride can be monitored through its effects on the elastic constants. After a well-defined thermal treatment, a relaxation process appears at 70 K in the kHz range, denoting the existence of a new species, likely involving hydrogen, that has a very high mobility. The species is estimated to "jump" at rate of $10^3$ $s^{-1}$ at the peak temperature corresponding to a relaxation rate of about $10^{11}$ $s^{-1}$ at room temperature. The activation energy of the process is 0.126 eV and the pre-exponential factor $7{\cdot}10^{-14}$ s, which is typical of point defect relaxation. The peak is very broad with respect to a single Debye process, indicating strong interaction or/and multiple jumping type of the mobile entity. The results of these studies will be presented and discussed in terms of their relationship to the mechanism of reversible elimination of hydrogen from the doped hydride.

Craig Jensen
University of Hawaii, Manoa

Date submitted: 03 Dec 2004

Electronic form version 1.4