NMR Studies of Hydrogen Diffusion in $LaNi_{5.0}H_{6.0}$ and $LaNi_{4.8}Sn_{0.2}H_{5.8}$

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Diffusion measurements of hydrogen in $LaNi_{5.0}H_{6.0}$ and $LaNi_{4.8}Sn_{0.2}H_{5.8}$ were made between 260 K and 360 K using the APFG-NMR technique. The diffusivity of hydrogen in $LaNi_{4.8}Sn_{0.2}H_{5.8}$ is characterized by a higher mobility and a lower activation enthalpy (H_a) than observed in $LaNi_{5.0}H_{6.0}$ The diffusivities at room temperature, D(300 K), arc $9.2 \times 10^{-12} m^2 s^{-1}$ and $3.8 \times 10^{-12} m^2 s^{-1}$ for $LaNi_{4.8}Sn_{0.2}H_{5.8}$ and $LaNi_{5.0}H_{6.0}$, respectively. Arrhenius fits to the diffusivities yielded activation enthalpies of $H_a = 0.32$ CV for $LaNi_{5.0}H_{6.0}$ and $H_a = 0.22$ eV for $LaNi_{4.8}Sn_{0.2}H_{5.8}$. Proton spin-lattice relaxation rates were also measured on the same samples in the temperat urc range between 100 K and 350 K. The D values and proton relaxation data arc shown to be consistent a diffusion mechanism involving at least two stage of hydrogen motion,

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