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NMR studies of the metal-hydrogen system ZrNi(H/D)$_x$ CALEB BROWNING, TIMOTHY IVANCIC, Department of Physics, Washington University, St. Louis, Missouri 63130-4899, ROBERT BOWMAN, JR., Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California 91190-8099, MARK CONRADI, Department of Physics, Washington University, St. Louis, Missouri 63130-4899 — Relaxation studies of the intermetallic ZrNiH$_x$ and ZrNiD$_x$ were performed using hydrogen and deuterium NMR. Correlation times for atomic diffusion were determined based on the temperature dependence of spin-lattice and spin-spin relaxation times. The motion is shown to be thermally activated over the temperature range 200 - 575 K, and the activation energies for diffusion are determined. The deuterium NMR spectra exhibit comparatively little line narrowing with temperature, indicating that the average electric field gradient is not zero, averaged over the deuterium atom sites of these non-cubic cells. Furthermore, the spectrum of ZrNiD$_{1.87}$ reveals a coexistence of two phases, in agreement with the phase diagram.

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