

Crystal electric field has been studied since the 1970s using inelastic neutron spectrometry. A simple one-day time-of-flight measurement on powdered samples is often used. This thesis aims to demonstrate a method of determination of the crystal electric field parameters based on the data obtained from neutron time-of-flight spectrometer on a single crystal. A single crystal of the intermetallic compound PrNi_5 was successfully prepared using the floating zone furnace and characterised using XRD, EDX, and Laue diffraction. The time-of-flight scattering on the single crystal was conducted using HYSPEC at ORNL. A Monte Carlo calculation was carried out based on the scattering data to determine the crystal electric field parameters. The usefulness of the time-of-flight scattering on a single crystal for crystal electric field determination, particularly for systems with many crystal field levels, was shown.