

Mössbauer Studies of Single Crystal $\text{Pr}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$

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Single crystal $\text{Pr}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$ was synthesized by using the floating zone method and the relation of magnetic properties and charge ordering transition with lattice dynamics was systematically investigated. Mössbauer spectra of $\text{Pr}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$ were taken at various temperatures ranging from 20 K to room temperature. The charge disproportionation, in which iron with valence states Fe^{3+} and Fe^{5+} was found in a ratio of 2:1, was detected in $\text{Pr}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$ below 190 ± 3 K. Iron with valence state Fe^{4+} coexisted in $\text{Pr}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$ at and above 150 K, and its ratio increased from 13 to 66 % with increasing temperature. This result means that charge-ordered and -disordered phases co-exist in $\text{Pr}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$.