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Hydrogen Absorption and its Effect on Magnetic Properties of $\text{Nd}_2\text{Fe}_{14}\text{B}$

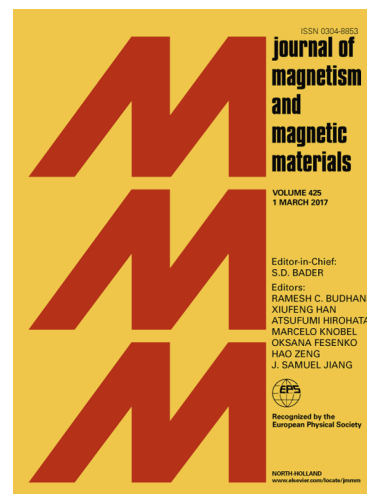
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Hydrogen Absorption and its Effect on Magnetic Properties of $\text{Nd}_2\text{Fe}_{14}\text{B}$

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Abstract

Magnetic properties of hydrides of the intermetallic compound $\text{Nd}_2\text{Fe}_{14}\text{BH}_x$ are investigated in the temperature range covering the Curie temperatures (T_C) of the compounds (up to 670 K). The temperature dependencies of magnetization are measured under continuous control of hydrogen content in the investigated samples. The dependencies of Curie and spin-reorientation transition (T_{SR}) temperatures on the hydrogen concentration are studied in detail. The dependence of hydrogen concentration on pressure at a constant temperature (near T_C) and on the temperature at various pressures are obtained. We attempted to estimate the contributions of the unit cell volume increase upon hydrogenation and the electronic structure change in the variation of T_C of the hydrogenated $\text{Nd}_2\text{Fe}_{14}\text{B}$.

Keywords: Hydrides, $\text{Nd}_2\text{Fe}_{14}\text{B}$, Hydrogen pressure, Curie temperature, Spin-reorientation transition

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