Magnetic Properties of Compounds $RE_2Cu_2Mg$ ($RE = Y, La, Pr, Nd$)

Gunter Kotzyba$^a$, Ratikanta Mishra$^b$, and Rainer Pöttgen$^a$

$^a$ Institut für Anorganische und Analytische Chemie, Westfälische Wilhelms-Universität Münster, Wilhelm-Klemm-Straße 8, D-48149 Münster

$^b$ Applied Chemistry Division, Bhabha Atomic Research Centre Trombay, Mumbai-400 085, India

Reprint requests to R. Pöttgen. E-mail: pottgen@uni-muenster.de

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The $Mo_2FeB_2$ type magnesium intermetallics $RE_2Cu_2Mg$ ($RE = Y, La, Pr, Nd$) were synthesized from the elements by reactions in sealed tantalum tubes in a high-frequency furnace. Temperature-dependent magnetic susceptibility measurements of $Y_2Cu_2Mg$ and $La_2Cu_2Mg$ indicate Pauli paramagnetism. $Pr_2Cu_2Mg$ and $Nd_2Cu_2Mg$ show Curie-Weiss behaviour with experimental magnetic moments of $3.67(2) \mu_B$/Pr and $3.47(2) \mu_B$/Nd, respectively. Both compounds are ordered ferromagnetically at Curie temperatures of $12.0(5)$ K ($Pr_2Cu_2Mg$) and $43.0(5)$ K ($Nd_2Cu_2Mg$). $Pr_2Cu_2Mg$ shows a very complex magnetization behavior with an additional magnetic transition around $2.5$ T. The neodymium compound shows a pronounced square loop behavior in the magnetization at $4.5$ K with a high remanent magnetization of $1.55(1) \mu_B$/Nd atom and a coercive field of $0.31(1)$ T.

Key words: Magnesium, Rare Earth Compounds, Magnetism