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Magnetic Properties and Corrosion Characteristics of Nd-(Fe, Co, Ni)-B Pseudo-Ternary Systems

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Synopsis :
Nd15(Fe1-x-yCoxNiy)77B8 pseudo-ternary magn et materials have been studied with respects to the Curie temperature, saturati on magnetization, intrinsic coercivity and corrosion characteristics. Substituted Co and Ni atoms enhance the saturation magnetization and intrinsic coercivity locally for composition ranges of 0.20 Ì x Ì 0.40 and 0 Ì y Ì 0.20. Marked improvement in corrosion resistance is observed for y Í 0.05 and x Í 0.30 in 95% relative humidity at 75 ¥. A possibility of corrosion-resistant Nd magnets with intrinsi c coercivity more than 10 kOe and energy product up to 30 MGOe is indicated by a further addition of Ti to the systems.

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Synopsis:

$Nd_{15}(Fe_{1-x-y}Co_xNi_y)_{77}B_8$ pseudo-ternary magnet materials have been studied with respects to the Curie temperature, saturation magnetization, intrinsic coercivity and corrosion characteristics. Substituted Co and Ni

line anisotropy and the magnetic moment. The 4f electrons are localized in a trivalent Nd ion, and the 3d

were prepared by arc-melting in an Ar atmosphere, rough-crushed into 32 mesh, and then jet-milled to a

sible to discuss the high magnetic properties of the Nd-Fe-B magnet by dividing its properties into the contri-

in a magnetic field of 12 kOe, followed by pressing under a load of 2 to 3 t/cm^2. The resulting compacts

tion or combined substitution is adopted. Thus it is possible to make the following conjecture: In the $Nd_2Fe_{14}B$ phase, a negative exchange-interaction takes place in Fe-

sity of Fe due to alloying of Fe with Co and Ni. Hamada[19] indicates that the state-density of Fe in Fe-Co and Fe-Ni alloys varies significantly depending upon

presumably causing a drop in Curie temperature.[18] The

positions. Binary alloys of the Fe-Co and Fe-Ni types are

Nd lowers the anisotropy field by about 2.5% [2.15,16].

When several phases exist in addition to the main phase, as in a sintered magnet, other factors such as the

gated to determine the effect of Co and Ni combined