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Evolution of ground state and upper critical field in $R_{1-x}Gd_xNi_2B_2C$ ($R = Lu, Y$): Coexistence of superconductivity and spin-glass state¹ S.L. BUD'KO, V.G. KOGAN, H. HODOVANETS, S. RAN, S.A. MOSER, M.J. LAMPE, P.C. CANFIELD, Ames Laboratory and Dept. of Physics and Astronomy, Iowa State University — We report effects of local magnetic moment, Gd^{3+} , doping ($x \leq 0.3$) on superconducting and magnetic properties of the closely related $Lu_{1-x}Gd_xNi_2B_2C$ and $Y_{1-x}Gd_xNi_2B_2C$ series. The superconducting transition temperature decreases and the heat capacity jump associated with it drops rapidly with Gd-doping; qualitative changes with doping are also observed in the temperature-dependent upper critical field behavior, and a region of coexistence of superconductivity and spin-glass state is delineated on the $x - T$ phase diagram. The evolution of superconducting properties can be understood within the Abrikosov-Gor'kov theory of magnetic impurities in superconductors taking into account the paramagnetic effect on upper critical field and the details of the $x - T$ phase diagrams.

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