

Electron Density Analysis of Borocarbides

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Quaternary rare earth nickel borocarbides, space group (139) *I4/mmm*, exhibit different low temperature properties [1,2]. Only superconductivity at temperatures of about 8 K is observed for $R = Y$, Lu. For $R = Ho$ additional magnetic ordering occurs in the range of 4 to 6 K whereas superconductivity is destroyed. Further cooling leads to superconductivity again which is the so called re-entrant behaviour. This depends strongly on the crystal composition within the small homogeneity range and the thermal treatment after crystal growth.

Single crystals of compositions mentioned above were investigated by means of single crystal diffraction methods using both X-ray tubes and high energy synchrotron radiation sources under ambient conditions. Structure refinement and Fourier Difference Analysis of the experimental data were performed to determine small influences of chemical and structural disorder.

Experimentally determined electron densities are compared with theoretical calculations.

[1] Nagarajan R., Mazumdar C., Hossain Z., Dhar S.K., Gopalakrishnan K.V., Gupta L.C., Godard C., Padalia B.D., Vijayaraghavan R., *Phys. Rev. Lett.*, 1994, **72**, 274. [2] Siegrist T., Cava R.J., Krajewski J.J., Peck W.F., *J. Alloys Compd.*, 1994, **216**, 135.

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