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Crystal structure and superconductivity in $(\mathbf{La}_{1-x}\mathbf{Y}_x)\mathbf{NiC}_2$[1] H.H. SUNG, K.J. SYU, T.F. LIAO, W.H. LEE, National Chung Cheng University — As observed in the powder X-ray diffraction and crystallographic data, the partial substitution of La with Y in $(La_{1-x}Y_x)NiC_2$ could be systematic up to the solubility limit near x = 0.35. The variation of room temperature lattice parameters, a, b, c and v of these substitute compounds are consistent with what one would expect from a chemical pressure effect. Magnetic, electrical and heat capacity measurements indicate that the change in T_c with x is similar to the change in the lattice parameter. It is found that the T_c change rate is dT_c/dx = –7.0 K and dT_c/dv = 0.46 K/Å^3. According to the BCS theory, the stiffening of the lattice under pressure may change both the electron-phonon coupling strength V and the electron density of states at the Fermi level, N(0), which will lead to the change of T_c. Analysis of the electron density of states at Fermi level N(0) from the specific heat data indicates that the effect of N(0) on T_c dominates in the $(La_{1-x}Y_x)NiC_2$ system.

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