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Boron excess and external pressure effects on NbB2[1] RICHARD FALCONI, DACB UJAT, RAUL ESCAMILLA, IIM UNAM, ALEJANDRO DURAN, CCMC UNAM, FRANCISCO MORALES, IIM UNAM, ROBERTO ESCUDERO, IIM UNAM — We report structural and electronic studies on $NbB_{2+x}$with nominal compositions $2.0 \leq B/Nb \leq 2.6$. After refinement the obtained compositions were found that are superconducting for $(B/Nb)_{ref} \geq 2.20(2)$. Structural analyses reveal that the boron excess induces significant changes in the Nb-B bond length, giving rise to an increase in the c axis and in the cell volume. The superconducting transition temperature, T_C, increases with boron content to a maximum at 9.8 K, for the composition $(B/Nb)_{ref} = 2.34(1)$. Electrical resistance measurements as a function of temperature and pressure show that T_C decreases at different rates, depending on boron excess. Samples with high concentration of boron show low dTc/dP rates. These experimental results are discussed in terms of possible Nb vacancies. The changes of T_C are correlated with the evolution of the structural parameters and compared with theoretical predictions of band structure.

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