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The local structure of transition metal doped semiconducting boron carbides JING LIU, P. A. DOWBEN, Dept. of Physics and Astronomy, Univ. Nebraska-Lincoln, GUANGFU LUO, State Key Laboratory for Mesoscopic Physics and Dept. of Physics, Peking Univ. ; Dept. of Physics, Univ. Nebraska-Omaha, WAI-NING MEI, Dept. of Physics, Univ. Nebraska-Omaha, ORHAN KIZILKAYA, Center for Advanced Microstructures and Devices, Louisiana State Univ., ERIC D. SHEPHERD, J. I. BRAND, College of Engineering, Univ. Nebraska-Lincoln — Transition metal doped boron carbides produced by plasma-enhanced chemical vapor deposition of orthocarborane (*closo*-1,2-$C_2B_{10}H_{12}$) and metallocenes were investigated by performing K-edge extended X-ray absorption fine structure and X-ray absorption near edge structure measurements. The Mn, Fe and Co transition metal atoms dope boron carbide pairwise. The transition metal atom occupies one of icosahedral boron or carbon apical site atomic site within the icosahedral cage on adjacent icosahedral cages. There is good agreement between the experiment and theoretical modeling of the local structure two adjoined carborane cages each with a Mn, Fe and Co metal atom (forming the pair wise doping). The local spin configurations of transition metal doped boron carbides, from Ti to Cu, are compared.

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