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**Electronic Structure Studies of Amorphous Hydrogenated Boron Carbide** M. SKY DRIVER, University of Missouri-Kansas City, JOSEPH SANDSTROM, Center for Nanoscale Science and Engineering, North Dakota State University, TEAK BOYKO, ALEXANDER MOEWES, Department of Physics and Engineering Physics, University of Saskatchewan, ANTHONY CARUSO, University of Missouri-Kansas City, CARUSO GROUP TEAM, MOEWES GROUP TEAM, NDSU TEAM — Boron carbide is a technologically relevant material with importance in voltaic transduction. However, the local physical, chemical and electronic structure of low temperature deposited thin films of amorphous boron carbide is far from understood, hindering its progress in application. X-ray absorption and emission spectroscopies (XAS/XES) were applied to thin films of $B_4C$ and $B_5C{:}H_x$ to study the near Fermi edge structure; the films were prepared by RF magnetron sputtering and plasma enhanced chemical vapor deposition (PECVD) and were thermally treated after deposition from 400 to 800 C. XES spectra indicate a physical structure transition from amorphous to nanocrystalline at 700 C, a much lower temperature than expected from traditional physical vapor deposition or flash annealing temperatures reported. These structural differences are of significant interest to transport measurements and will be discussed as a correlation. Further, x-ray and ultraviolet photoemission were also collected as a compliment to XES/XAS and will be discussed in the context of understanding the local intra vs. intermolecular electronic structure of these boron-rich molecular based solids.

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