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Role of precursor crystal structure on electrochemical performance of carbide-derived carbon electrodes BENJAMIN PALAZZO, ZACH NORRIS, GREG TAYLOR, Department of Physics and Astronomy, Rowan University, LEI YU, Department of Chemistry and Biochemistry, Rowan University, SAMUEL LOFLAND, JEFFREY HETTINGER, Department of Physics and Astronomy, Rowan University — Binary carbides with hexagonal and cubic crystal structures have been synthesized by reactive magnetron sputtering of vanadium and other transition metals in acetylene or methane gas mixed with argon. The binary carbides are converted to carbide-derived carbon (CDC) films using chlorine gas in a post-deposition process in an external vacuum reaction furnace. Residual chlorine has been removed using an annealing step in a hydrogen atmosphere. The CDC materials have been characterized by x-ray diffraction, x-ray fluorescence, and scanning electron microscopy. The performance of the CDC materials in electrochemical device applications has been measured with the hexagonal phase precursor demonstrating a significantly higher specific capacitance in comparison to that of the cubic phase. We report these results and pore-size distributions of these and similar materials.

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