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Controlling the microstructure of binary carbide films with elemental substitutions¹ K. FELLER, M. HAIDER, A. HODGES, R. SPRENG, E. POSBERGH, H. WOODWARD, S.E. LOFLAND, J.D. HETTINGER, Physics and Astronomy, Rowan University, M. HEON, Y. GOGOTSI, Materials Science and Engineering, Drexel University — We report on experiments to control the microstructure of textured binary carbide thin films deposited by reactive magnetron sputter deposition. Controlling the microstructure in these materials is important as the microstructure of these films provides a template for the resulting carbide-derived carbon (CDC) film and impacts their performance. Specifically, a combinatorial approach is used to add chromium to TiC films creating a compositional gradient as a function of position. We present a measurement of surface roughness as a function of material composition. The resulting materials, $(\text{Ti}_{1-x}\text{Cr}_x)\text{C}$ films, are significantly smoother than their pure TiC counterparts and the resulting CDC's have correlated defects which will improve the performance of the CDC in supercapacitor applications.

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Jeffrey Hettinger
Physics and Astronomy, Rowan University

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