

Abstract Submitted  
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**Combinatorial Synthesis of  $(V_{1-x},Cr_x)_2GeC$  Epitaxial Films<sup>1</sup>** C. E. STEINMETZ, J. R. APPLGATE, S. M. BENJAMIN, B. D. ADAMSON, J. D. HETTINGER, S. E. LOFLAND, Department of Physics and Astronomy, Rowan University, T. H. SCABAROZI, Department of Materials Science and Engineering, Drexel University — We report the synthesis of solid solutions of  $(V_{1-x},Cr_x)_2GeC$  epitaxial films on single crystal  $Al_2O_3$  epi-polished substrates. The materials are sputtered from four cathodes; three are powered by rf-power supplies while one is driven by a dc-power supply. The materials are co-deposited at a temperature of 900 ° C and we get solubility across the whole range of compositions. The substrate-film interaction creates a strain which makes the new phase energetically favorable. The surface structure was measured using atomic force microscopy revealing that the composition has little impact on this property. We found a new MAX-phase material,  $(V_{0.5}Cr_{0.5})_4GeC_3$ , which has never been synthesized in bulk form. We report the conditions required to make these materials. In addition, electrical transport characteristics as a function of composition will be reported.

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