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Thin Film Synthesis and Characterization of MAX-Phase Compounds[1] T. H. SCABAROZI, Materials Science and Engineering, Drexel University, W. TAMBUSSI, J. D. HETTINGER, S. E. LOFLAND, Department of Physics and Astronomy, Rowan University, M. W. BARSOUM, Materials Science and Engineering, Drexel University — We present the synthesis and characterization of thin film MAX-phase compounds. Thin film synthesis was performed by magnetron sputtering from compound and elemental target materials on 2-inch c-axis sapphire wafers. A series of experiments were carried out where parameters of temperature, gas flow, pressure, and cathode power were varied. Films were characterized by Raman spectroscopy, electron microscopy, X-ray diffraction, and atomic force microscopy. Most films were readily synthesized with multiple-phases which were hexagonal or cubic. All phases were epitaxial, with growth along the (000l) and (111) direction for hexagonal and cubic compounds, respectively. With careful control of temperature and stoichiometry, single phase films were produced. Surprisingly, we synthesized Ti_2AlC by diffusion of Al from the substrate while only sputtering Ti and C.

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