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The effect of M (M=Ti,Cr,V,Nb) on the transport and elastic properties of nanolayered ternary carbides M2AlC[1] J. HETTINGER, P. FINKEL, T. MEEHAN, S. LOFLAND, K. HARRELL, Dept. of Physics and Astronomy, Rowan University, M. BARSOUM, A. GANGULY, S. GUPTA, Dept. of Materials Engineering, Drexel University — We report a systematic investigation of the electronic, magneto-transport, thermal and elastic properties of the family of materials M_2AlC where M is Ti, V, Cr or Nb in the temperature range 4 to 300K. The elastic constants were measured for all compounds ultrasonically. The bulk moduli and anisotropic Young's moduli were found to vary in these compounds depending on the transition metal M. The Debye temperatures were in the 640-710 K range for all materials investigated. The Seebeck coefficients for these four materials were small with differing temperature dependences. All but the Nb containing material have Seebeck coefficients that change sign. The electrical conductivity, Hall coefficient and magnetoresistances are analyzed within a two-band framework assuming a temperature-independent charge carrier concentration. We concluded that there is little correlation between the Seebeck voltage and Hall number. As with other MAX-phase materials, all these materials are nearly compensated. Comparisons between these results will be presented. Results will be discussed in relation to theoretical work and recent measurements on related systems.

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