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Thermal transport and heat capacity of Ti_3AlCN and $Ti_2AlC_{0.5}N_{0.5}$[1] T. H. SCABAROZI, M. BARSOUM, A. GANGULY, S. GUPTA, Department of Materials Engineering, Drexel University, S.E. LOFLAND, J.D. HETTINGER, P. FINKEL, Department of Physics and Astronomy, Rowan University — We report an investigation of the specific heat and the thermal transport of a subset of the so-called MAX-phase family of materials Ti_3AlCN and $Ti_2AlC_{0.5}N_{0.5}$.The thermal transport results are analyzed to investigate the impact of mixing C and N on the X-sites. The heat capacity results are investigated to determine if this mixing influences the density of electronic states. We find that these mixtures have larger thermal conductivities than Ti_3AlC_2, Ti_2AlN or Ti_2AlC (Ti_3AlN_2 has not yet been synthesized). This increase has been attributed to an increase in the phonon thermal conductivity due to solid solution hardening. An increased elastic modulus is consistent with this result and the fact that the Debye temperature increases in the mixture and is in excess of 700K.

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Jeffrey Hettinger
Rowan University

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