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High temperature ferrielectricity and ferrimagnetism in $LnACrOsO_6$ by design HENA DAS, SAURABH GHOSH, AEP, Cornell University, Ithaca, NY, USA, MARTHA GREENBLATT, Dept of C. C. B., Rutgers University, Piscataway, NJ, USA, TANUSRI SAHA-DASGUPTA, S.N. Bose National Centre for Basic Sciences, Kolkata, India, CRAIG FENNIE, AEP, Cornell University, Ithaca, NY, USA — Despite intense efforts over the last decade, there are surprisingly few multiferroics in which a net magnetization coexists with a switchable polarization at room temperature. Since magnetism tends to be the harder problem, one approach to solve this challenge is to start with a material that is magnetically ordered at room temperature and drive it ferroelectric. In this regard, the double perovskite Sr_2CrOsO_6 is a promising candidate; it is ferromagnetic and insulating with a $T_c = 725$ K, the highest known T_c of any magnetic insulating oxide with appreciable uncompensated magnetic moment. Here we discuss our first-principles study of the ferroic properties of as not yet synthesized $3d$-$5d$ double perovskites, $LnACrOsO_6$ (Ln = La, Y, Ce-Lu; A = Na, K). We identify polar compounds that have moderate polarization switching barriers and display ferrimagnetism that is expected to persist above room temperature.

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