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Geometrically frustrated double perovskite synthesis and structural characterization[1] WILLIAM MARTIN, JEFFERSON TORO, DEMETRIOS PAPAKOSTAS, JEREMY P. CARLO, Villanova University — Geometric frustration occurs when magnetic order is inhibited by the arrangement of ions in a material. Typically associated with triangular or tetrahedral coordination of moments favoring antiparallel alignment, frustration results in rich magnetic phase diagrams, and is thus of interest for elucidating the development of magnetism in materials. Double perovskites $A_2BB'O_6$ potentially exhibit frustration, and the chemical versatility of the perovskite structure enables systematic studies of frustration physics across a wide array of compounds. We report structural characterization of compounds based on the $4d^1$ Mo^{5+} ion synthesized via solid state methods. We find that Ba_2YbMoO_6 and Ba_2LuMoO_6 crystallize in a simple cubic perovskite structure, whereas Sr_2YMoO_6 exhibits a monoclinic structure, consistent with prior results. Syntheses of Sr_2GaMoO_6, Ca_2AlMoO_6, Sr_2ScMoO_6, Ba_2InMoO_6, Sr_2AlMoO_6, Ba_2ScMoO_6, Ba_2GaMoO_6, and Ba_2AlMoO_6 were attempted, although the desired phases were not produced. Possible causes include loss or non-reactivity of precursors, and phase diagrams favoring non-perovskite structures.

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