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High-pressure synthesis and physical properties of A-site ordered perovskites

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ABO₃-type perovskite oxides exhibit a wide variety of interesting physical properties such as superconductivity, colossal magnetoresistance, multiferroic behavior etc. For a simple ABO₃ perovskite, if three quarters of the A site is replaced by a transition metal A', then the so-called A-site ordered double perovskite with the chemical formula of AA'₃B₄O₁₂ can form. Since both A' and B sites accommodate transition metal ions, in addition to conventional B-B interaction, the new A'-A' and/or A'-B interaction is possible to show up, giving rise to the presence of many novel physical properties. Here we will show our recent research work on the high-pressure synthesis of several A-site ordered perovskites as well as a series of interesting physical properties like temperature- and pressure-induced intermetallic charge transfer, negative thermal expansion, magnetoelectric coupling multiferroic and so on. [1-3]

[1] Y. W. Long et al, *Nature*, 458, 60 (2009)., [2] Y. W. Long et al, *J. Am. Chem. Soc.* 131, 16244 (2009)., [3] Y. W. Long et al, *Chem. Mater.* 24, 2235 (2012).

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