

## Structural, Magnetic and Thermodynamic Investigation of Iridium Double Perovskites with Ir<sup>5+</sup>

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**Abstract :** Recently, the iridate double perovskite Sr<sub>2</sub>YIrO<sub>6</sub> has attracted considerable attention due to the report of unexpected magnetism in this Ir<sup>5+</sup> material, in which according to the Jeff model, a non-magnetic ground state is expected. Structural, magnetic and thermodynamic investigations of Sr<sub>2</sub>YIrO<sub>6</sub> and Ba<sub>2</sub>YIrO<sub>6</sub> single crystals, with emphasis on the temperature and magnetic field dependence of the specific heat will be presented. The single crystals were grown by using SrCl<sub>2</sub> and BaCl<sub>2</sub> as flux. Single-crystal X-ray diffraction measurements performed on several crystals from different preparation batches showed a high quality of the crystals, proven by the good internal consistency of the data collected using the full-sphere mode and an extremely low R factor. In agreement with the expected non-magnetic ground state of Ir<sup>5+</sup> (5d<sup>4</sup>) in these iridates, no magnetic transition is observed down to 430 mK. Moreover, our results suggest that the low-temperature anomaly observed in the specific heat is not related to the onset of long-range magnetic order. Instead, it is identified as a Schottky anomaly caused by paramagnetic impurities present in the sample, of the order of

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