Poster Presentation

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First evidence of a phase transition in a high-pressure metal iodate.

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In the 1970s, a large number of metal iodates compounds were extensively investigated for their nonlinear optics (NLO) properties as well as for their ferroelectric, piezoelectric, and pyroelectric properties. Interest in these compounds resumed in the early 2000s. We have shown that metal iodates are particularly interesting for for quadratic NLO in mid IR, as they possess a large domain of transparency from the visible region to the beginning of the far IR region (12.5 µm), thus covering the three atmospheric transparency windows. The synthesis of metal iodates has so far been mainly investigated by solution chemistry, under hydrothermal conditions or by the flux method. The solid state synthesis of these compounds at high pressure has never been explored. To date, only the structural evolution of α-LiIO3 with pressure has been studied by X-ray powder diffraction [1]. It was shown that, at room temperature, α-LiIO3 is stable up to 75 GPa; only compression of the lattice parameters with pressure was observed. In this work, we present a new phase of silver iodate obtained at high pressure from α-AgIO3 and characterized by X-ray powder diffraction. The α-AgIO3 to β-AgIO3 transition was characterized by differential thermal analysis (DTA) at high pressure [2-3]. The thermal behaviors of α-AgIO3 and β-AgIO3 were studied by differential scanning calorimetry (DSC) at ambient pressure and in situ temperature-dependent X-ray powder diffraction. Structural studies of these two phases were carried out to understand the formation of β-AgIO3.

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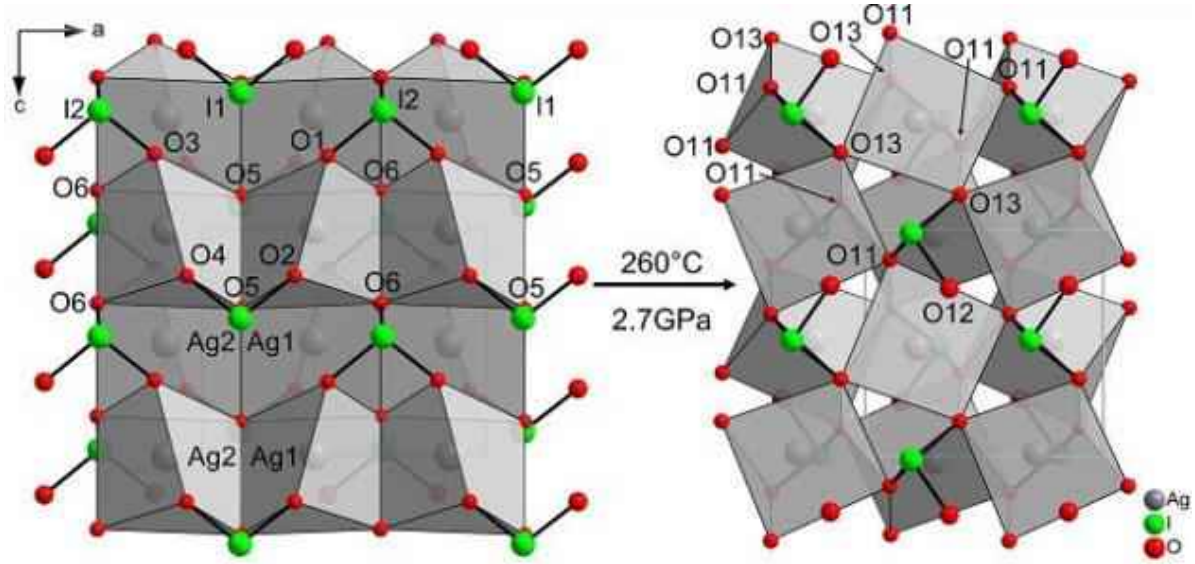

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