# Pressure-induced changes in the structural properties of potassium-based prussian blue analogues

## L. Janus1, H. L. B. Boström1

### 1Stockholm University, Department of Chemistry, Svante Arrhenius väg 16C, 109691 Stockholm, Sweden

### lara.janus@su.se

Prussian blue analogues (PBAs) are coordination compounds comprising a metal cyanido framework of general formula A*x*M[M′(CN)*6*]*y*·*n*H2O with A representing alkali metals and M/M′ representing transition metals. The structure consists of transition metal centres connected through cyanide bridges in an octahedral arrangement. PBAs have generated a lot of interest due to the large degree of structural freedom in this family of compounds, including A, M, M’, or hydration, allowing for variable properties that are ideal for a broad range of applications, such as multiferroic materials [1].Multiferroic materials combine switchable electric and magnetic order, and carry immense potential for applications in data storage systems [2]. Polar symmetry is required for multiferroic behaviour. In A*x*Mn[Co(CN)6]*y*·*n*H2O, phase transitions to polar symmetry appear under pressure, stemming from a hybrid improper ferroelectric mechanism [3, 4]. Hybrid improper ferroelectricity means the spontaneous polarisation induced by two different structural distortions collectively working together, which is here the tilting and the A-site cation order.In this study, we present the hydrothermal synthesis of the potassium-based Prussian blue analogue K*x*Mn[Co(CN)6]*y* at various pressure points. We shed light on pressure-dependent phase transitions and analyse the respective structural properties of these phases.



###### **Figure 1**. Excerpt of the crystal structure of K*x*Mn[Co(CN)6]*y*.

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#### [2] Scott, J. F. (2007) *Science*. **315**, 954−959.

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