

Supplementary information:

The PXRD patterns registered with Cu K α of the different Sm- and Eu-samples are given in figures S1, S2, S5 and S6 together with the fits obtained from Rietveld refinements in the cubic space group (Pm-3m). Note that for the $\text{Eu}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{13.81}$, which is slightly more distorted a refinement was also carried out in the tetragonal space group P4/mmm (figures S3 and S4).

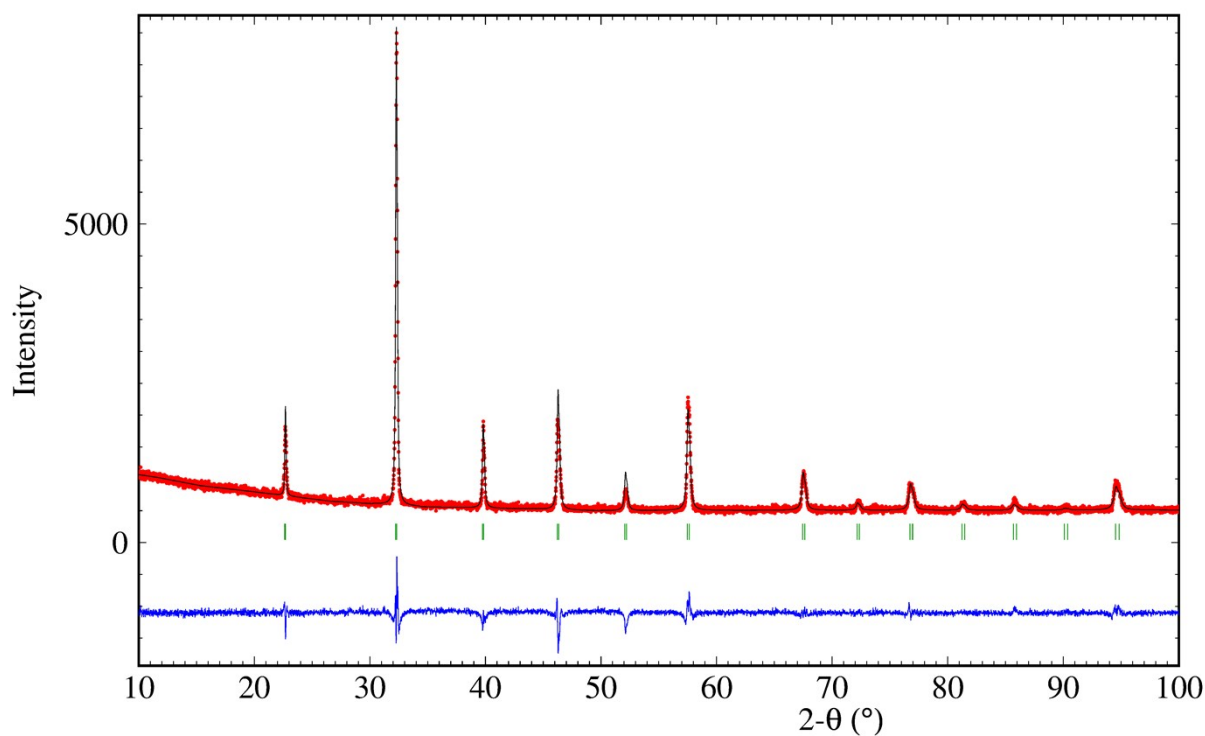


Figure 1 : Rietveld refinement of $\text{Eu}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{13.81}$ with cubic symmetry (S.G. : Pm-3m)

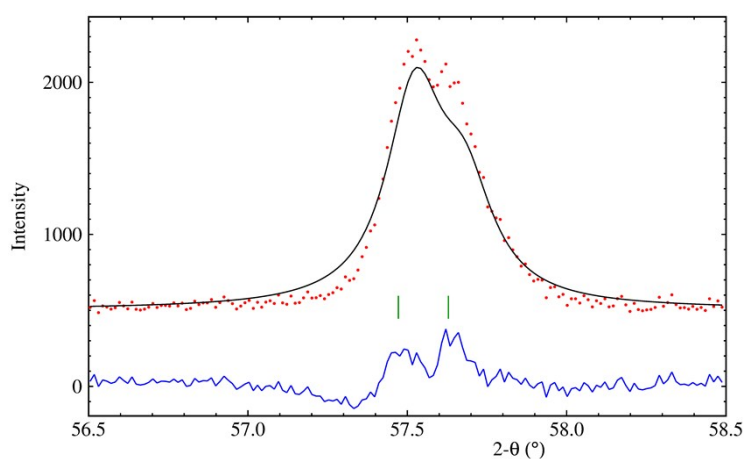


Figure 2: Enlargement of (211) reflection for $\text{Eu}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{13.81}$ with cubic symmetry

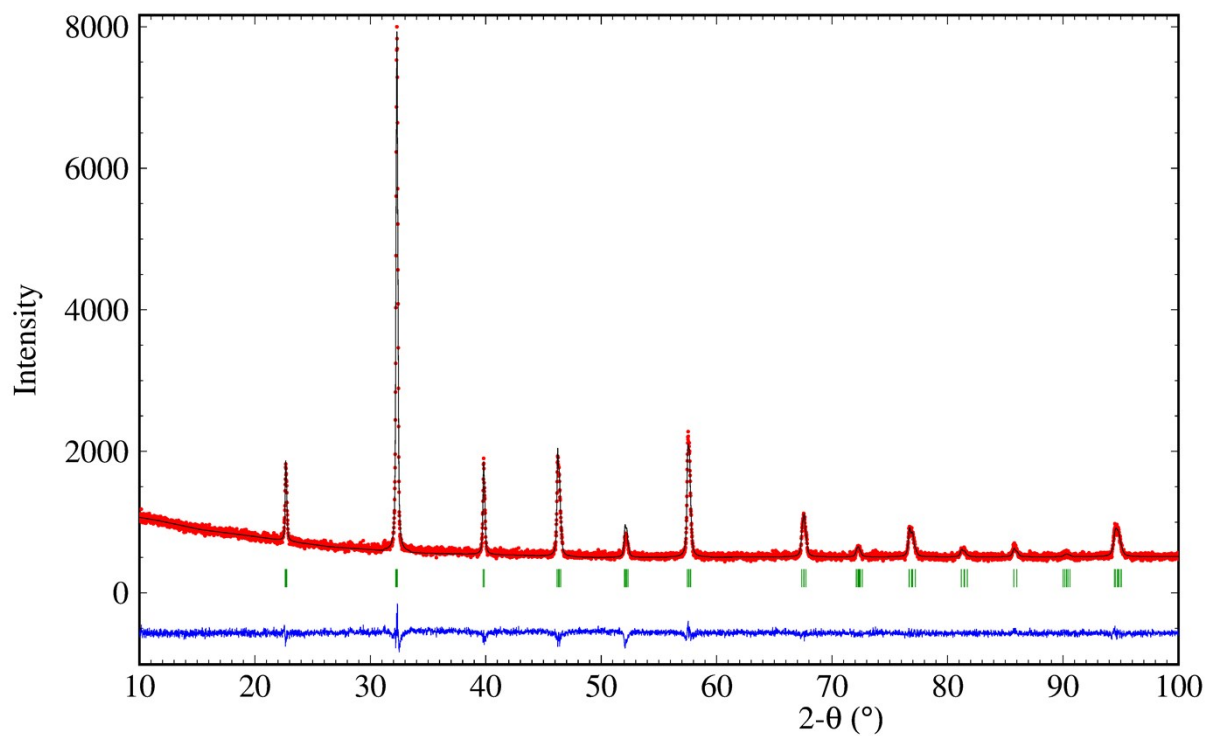


Figure 3: Rietveld refinement of $\text{Eu}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{13.81}$ with tetragonal symmetry (S.G. : P4/mmm)

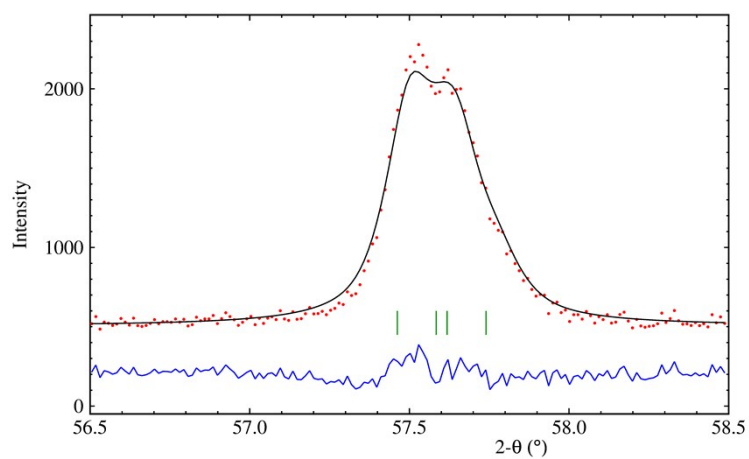


Figure 4: Enlargements of (211) and (112) reflections for $\text{Eu}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{13.81}$ with tetragonal symmetry.

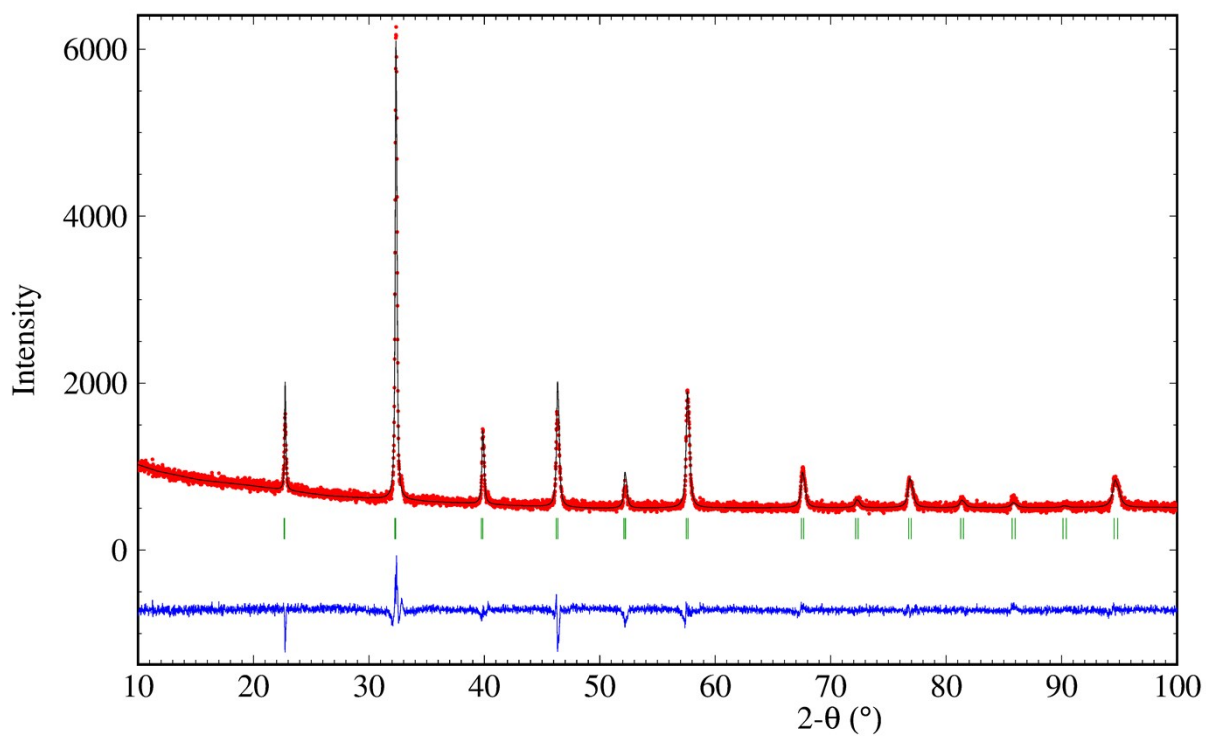


Figure 5 : Rietveld refinement of $\text{Eu}_2\text{Ba}_3\text{Fe}_3\text{Co}_2\text{O}_{13.72}$ with cubic symmetry (S.G. : Pm-3m)

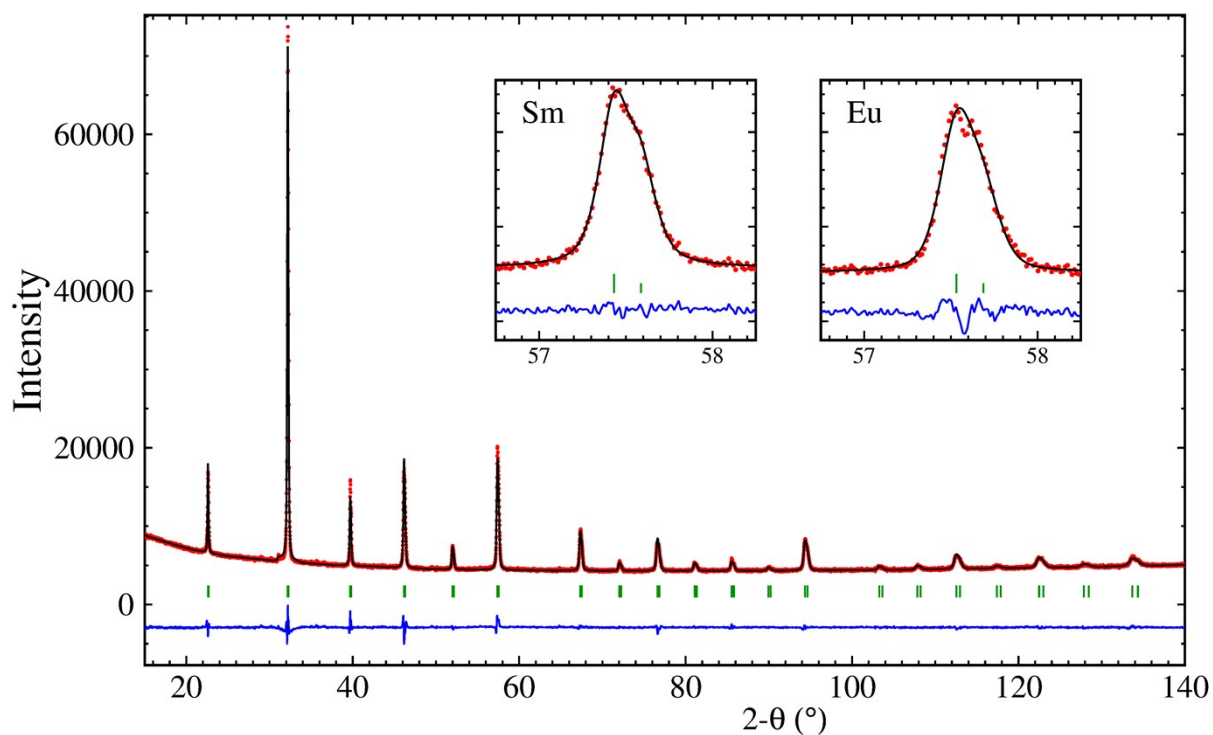


Figure 6: Rietveld refinement of $\text{Sm}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{14.16}$. Insets are showing enlargements of 211 peaks of $\text{Sm}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{14.16}$ and $\text{Eu}_2\text{Ba}_3\text{Fe}_{3.5}\text{Co}_{1.5}\text{O}_{13.81}$ phases for comparisons.