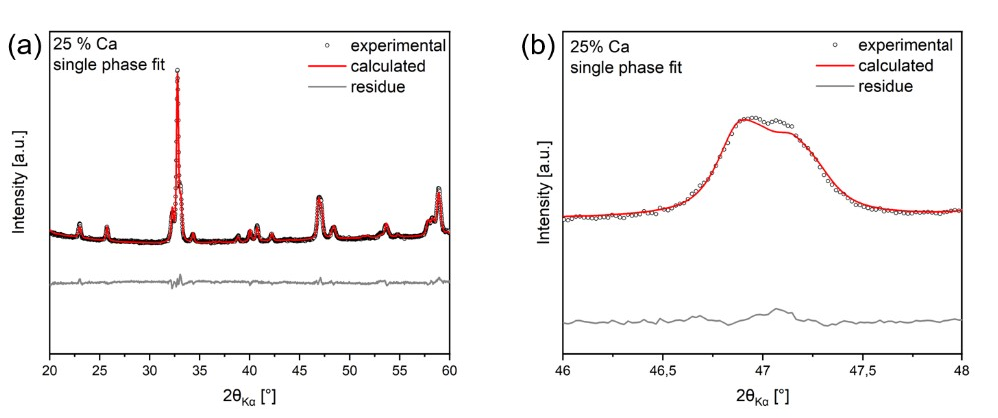
**Hole doped high entropy ferrites: Structure and charge compensation mechanisms in (Gd0.2La0.2Nd0.2Sm0.2Y0.2)1-xCaxFeO3**

Luis Eiselta, Robert Krukb, Horst Hahna,b,\*, Abhishek Sarkara,b,\*

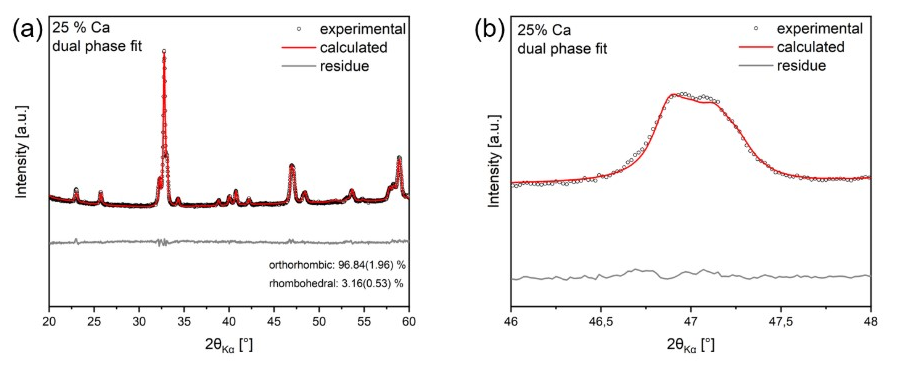
*aKIT-TUD-Joint Research Laboratory Nanomaterials, Technical University of Darmstadt, Otto-Berndt-Str.* *3, 64287 Darmstadt, Germany*

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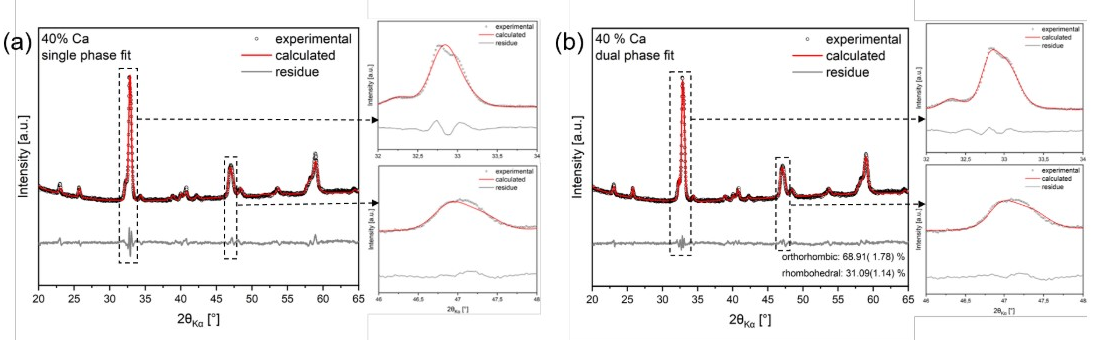
*\**Corresponding author: [abhishek.sarkar@kit.edu](mailto:abhishek.sarkar@kit.edu), [horst.hahn@kit.edu](mailto:horst.hahn@kit.edu)



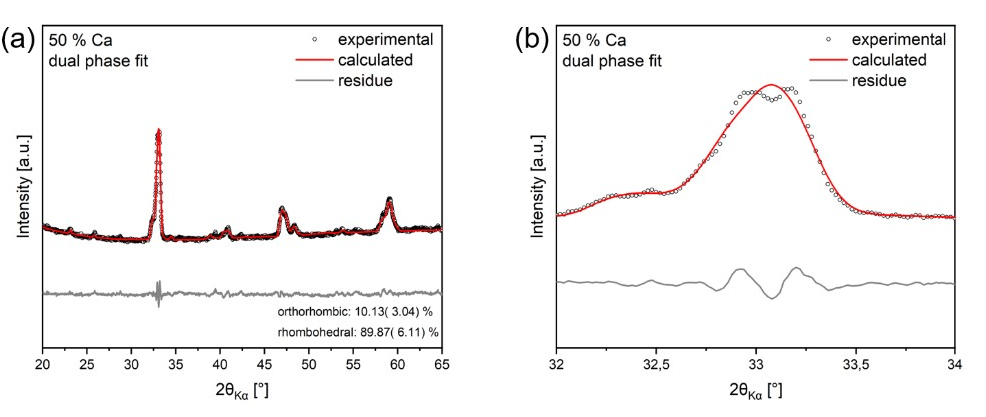
**Figure SI1.** (a) Single phase orthorhombic fit of 25 % Ca doped (Gd0.2La0.2Nd0.2Sm0.2Y0.2)1-xCaxFeO3. (b) Exemplary representation of the slight misfit between experimental and calculated pattern for the single phase refinement.



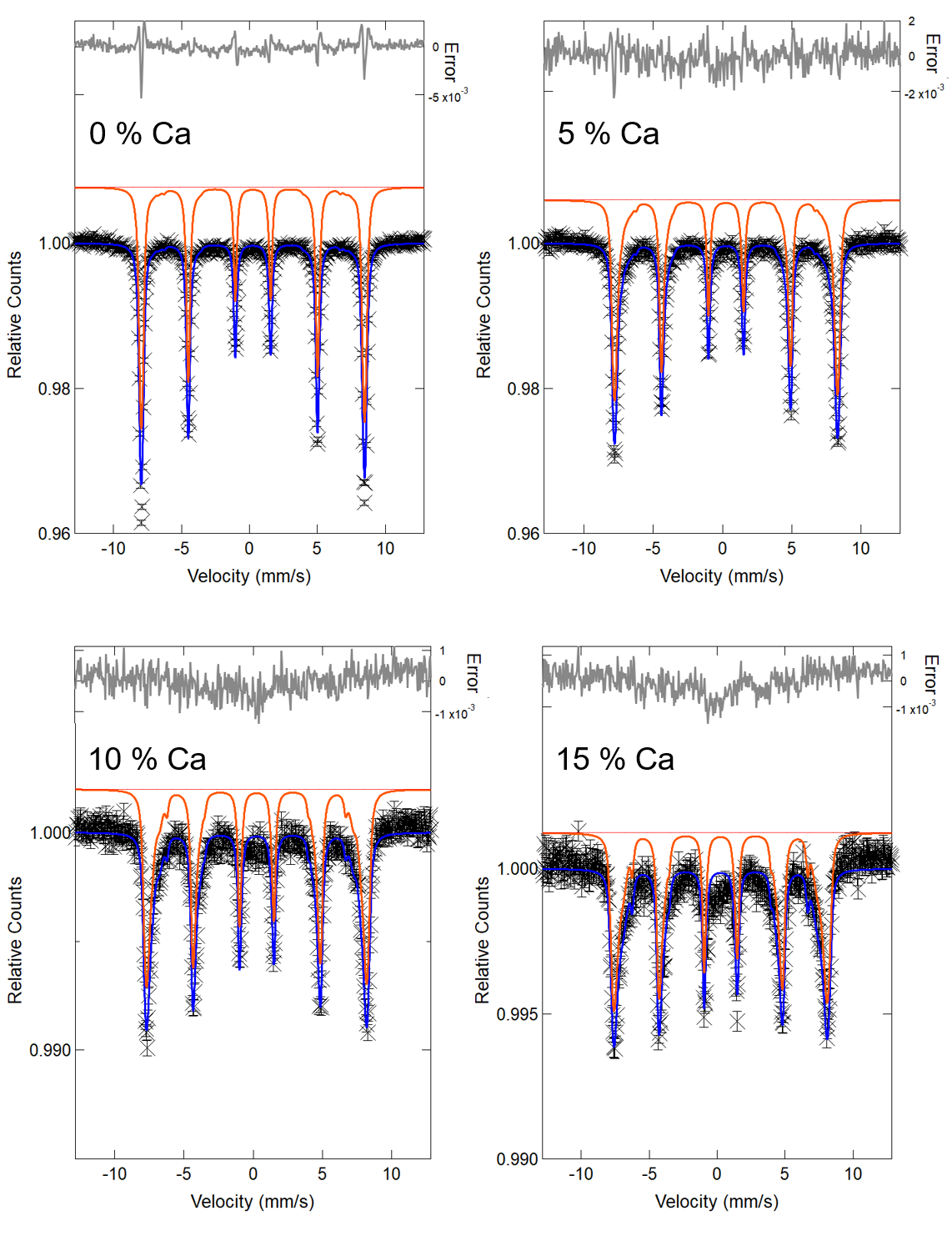
**Figure SI2.** (a) Dual phase fit (Pbnm + R-3c) of 25 % Ca doped (Gd0.2La0.2Nd0.2Sm0.2Y0.2)1-xCaxFeO3. (b) Exemplary representation of the improved fit between experimental and calculated pattern for the dual phase refinement process.



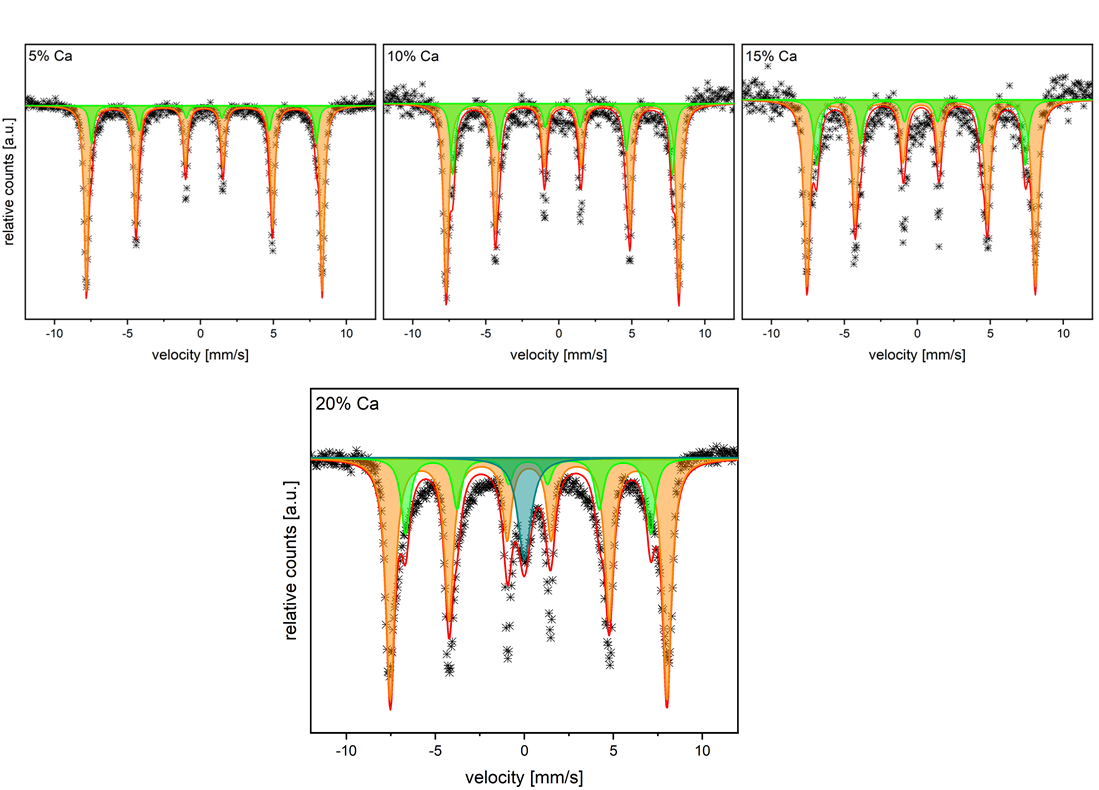
**Figure SI3.** (a) Single phase (Pbnm) Rietveld fit and (b) dual phase (Pbnm + R-3c) Rietveld fit of 40 % Ca doped (Gd0.2La0.2Nd0.2Sm0.2Y0.2)1-xCaxFeO3.



**Figure SI4.** (a) Dual phase (Pbnm + R-3c) Rietveld fit of the 50 % Ca doped sample. (b) Zoom-in image of the critical region, i.e., around the highest intensity peak.



**Figure SI5.** Mössbauer spectra of 0 %, 5 %, 10 % and 15 % Ca doped systems fitted with the sextet distributions. The respective probabilities of hyperfine distributions are given in Figure 6a (main text).



**Figure SI6.** Mössbauer spectra fitted with two magnetic sextets of 5 %, 10 %, 15 %, 20 % Ca doped systems. Additional singlet is required to fit the 20 % Ca doped system.

**Table SI1.** Values for the refined lattice parameters, atomic positions and fractions of each phase along with the goodness of fit (GoF).

