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ARTICLE

Electronic Supplementary Information (ESI)

Co-crystallization of red emitting $(NH_4)_3Sc(SO_4)_3:Eu^{3+}$ microfibers: structure-luminescence relationship for promising application in optical thermometry

L.A. Pasechnik, A.O. Peshehonova, O.A. Lipina, I.S. Medyankina, A.Yu. Chufarov, A.N. Enyashin, A.P. Tyutyunnik

[a] *Institute of Solid State Chemistry, Russian Academy of Sciences (Ural Branch), Ekaterinburg 620990, Russia. E-mail: pasechnik@ihim.uran.ru*

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Electronic Supplementary Information (ESI) available: [details of any supplementary information available should be included here]. See DOI: 10.1039/x0xx00000x

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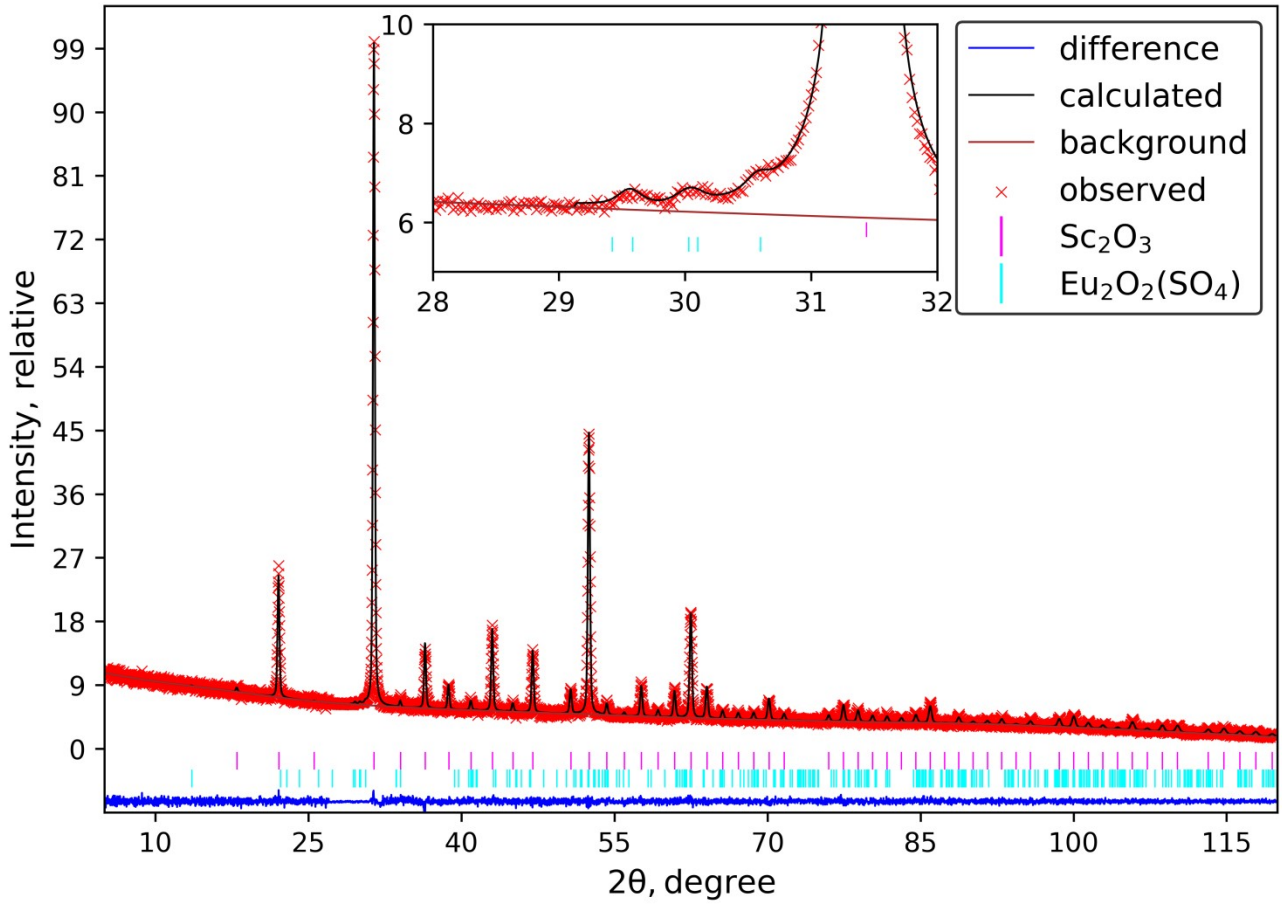

Fig. S1. The XRPD pattern of the decomposition products, formed after heating $(NH_4)_3Sc(SO_4)_3$:0.005Eu^{3+} up to 1073 K. The data in the range 27-32 were additionally collected in long time, which is equivalent of 12.5 hours per point for scintillator detector.

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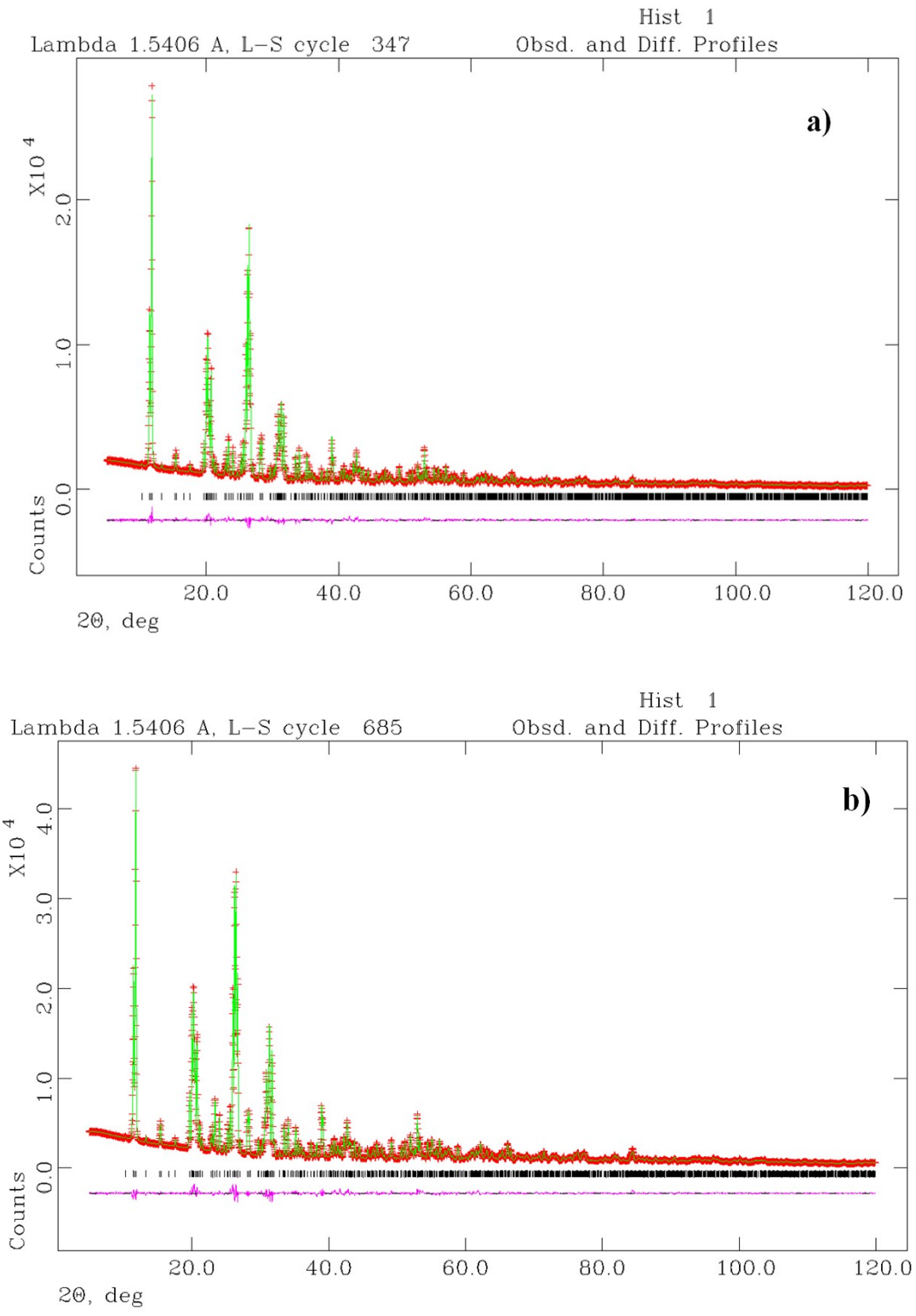

Fig. S2. Experimental (crosses), calculated (solid line), and difference (bottom line) XRPD patterns of the low-temperature modification of $(NH_4)_3Sc(SO_4)_3$:0.005Eu^{3+} before (a) and after (b) the thermal cycling . Series of tick marks correspond to the Bragg reflection.

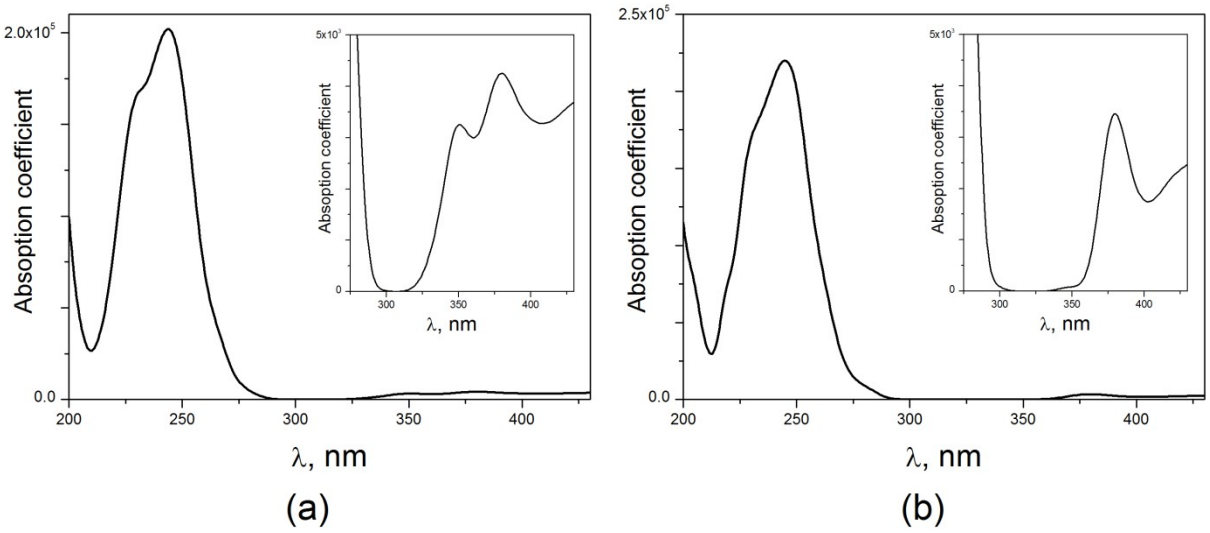

Fig. S3. Simulated optical absorption spectra for polycrystalline $(NH_4)_3Sc(SO_4)_3$ polymorphs doped by Eu^{3+}: low-temperature monoclinic phase (a) and high-temperature rhombohedral phase. DFT GGA calculations.

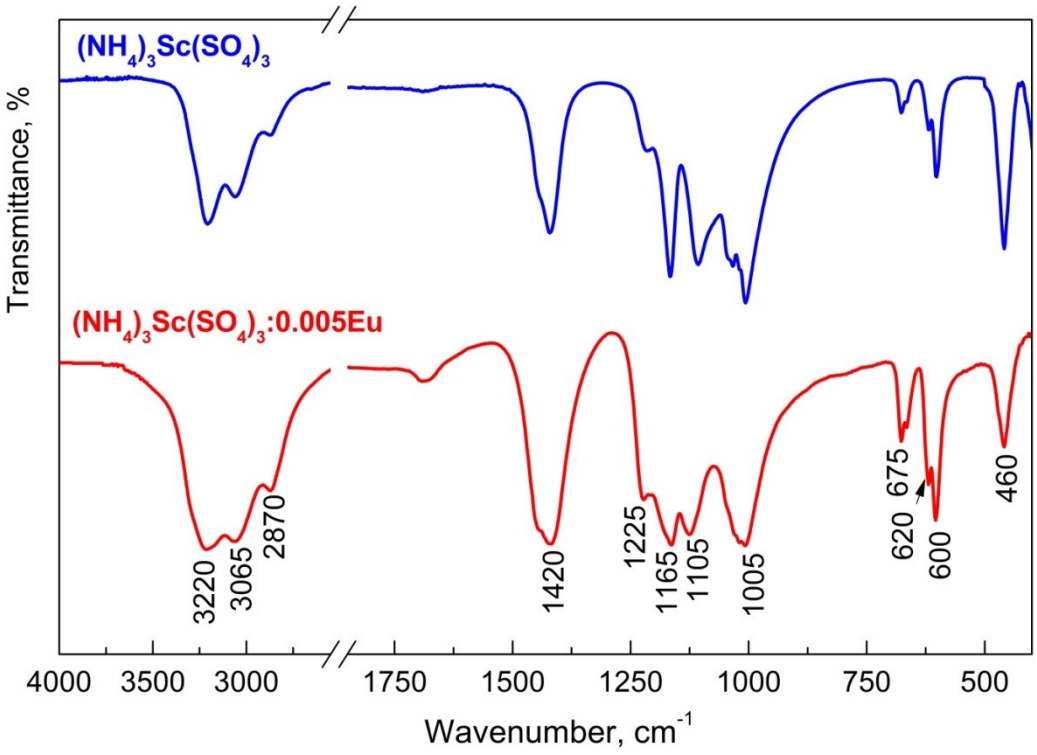

Fig. S4. IR spectra of $(NH_4)_3Sc(SO_4)_3$ and $(NH_4)_3Sc(SO_4)_3$:0.005Eu^{3+} measured at T = 298 K.

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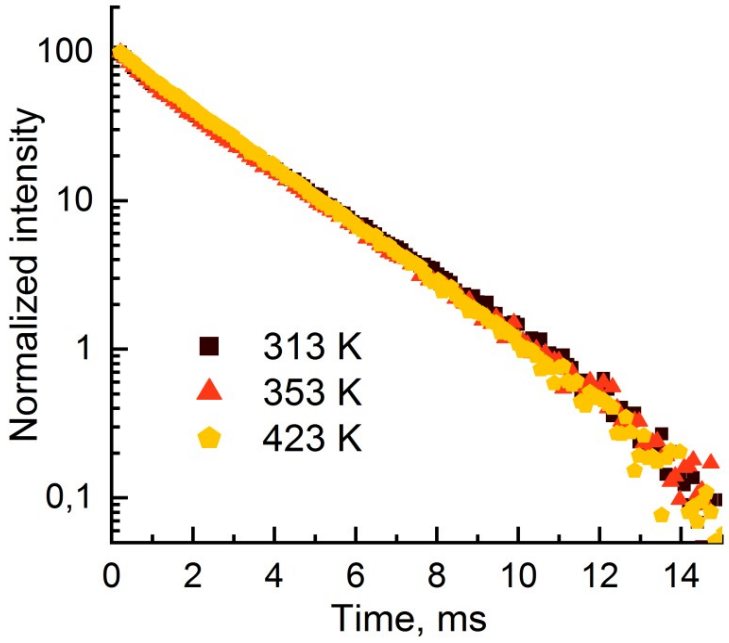

Fig. S5. The photoluminescence decay curves of 618 nm emission in $(NH_4)_3Sc(SO_4)_3$:0.005Eu^{3+} under 248 nm excitation (T = 313, 353 and 423 K).

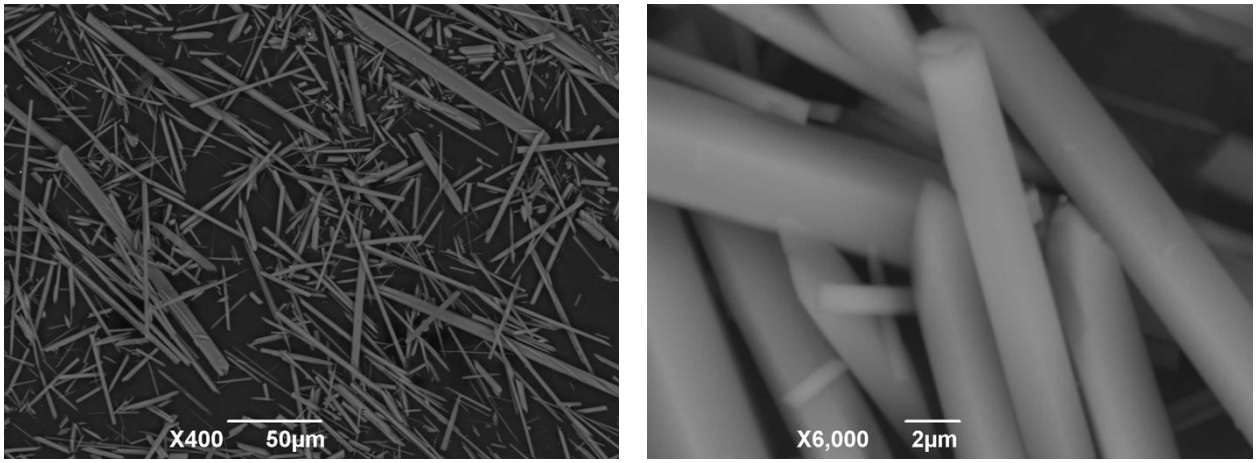

Fig. S6. SEM image of $(NH_4)_3Sc(SO_4)_3$:0.005Eu^{3+} after the thermal cycling (signal BEC).

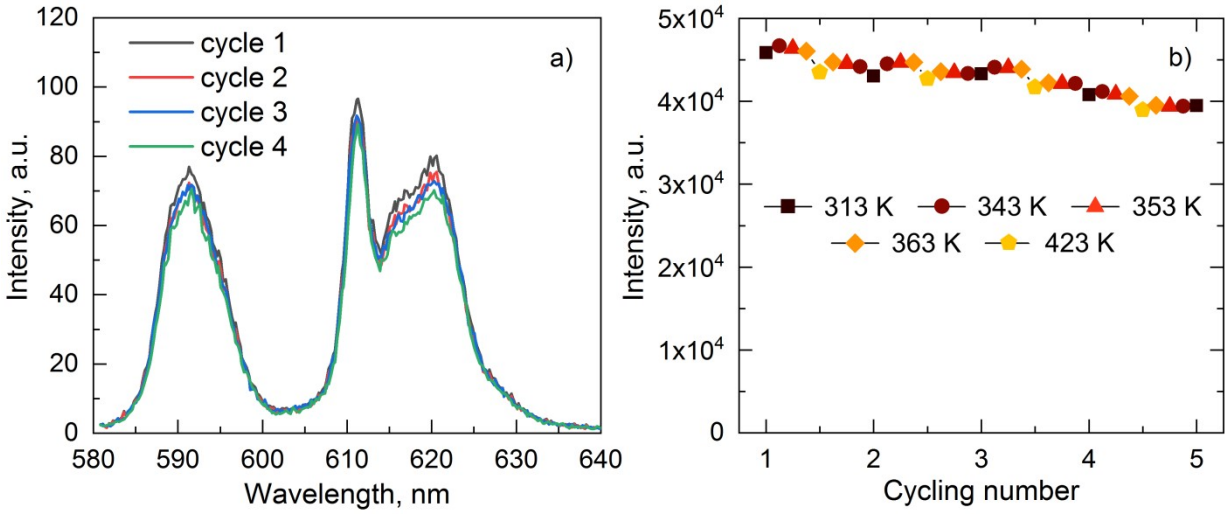

Fig. S7. PL spectra (λ_{ex} = 248 nm) of $(NH_4)_3Sc(SO_4)_3:Eu^{3+}$ measured at T = 313 K (a); luminescence intensity (λ_{ex} = 248 nm) of $(NH_4)_3Sc(SO_4)_3:0.005Eu^{3+}$ phosphor at different temperatures (b) during multiple repeated measurements.

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