Synthesis, structure, and physical properties of new rare earth ferrocenoylacetonates

Pavel S. Koroteev,[a,*] Zhanna V. Dobrokhotova,[a] Andrey B. Ilyukhin,[a] Nikolay N. Efimov,[a] Mathieu Rouzières,[b,c] Mikhail A. Kiskin,[a] Rodolphe Clérac,[b,c,*] and Vladimir M. Novotortsev[a]

[a] *N.S. Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences, Leninsky prosp. 31, GSP-1, 119991 Moscow, Russian Federation*

E-mail: pskoroteev@list.ru

[b] *CNRS, CRPP, UPR 8641, F-33600 Pessac, France.*

E-mail: clerac@crpp-bordeaux.cnrs.fr

[c] *Univ. Bordeaux, CRPP, UPR 8641, F-33600 Pessac, France.*

SUPPLEMENTARY MATERIALS

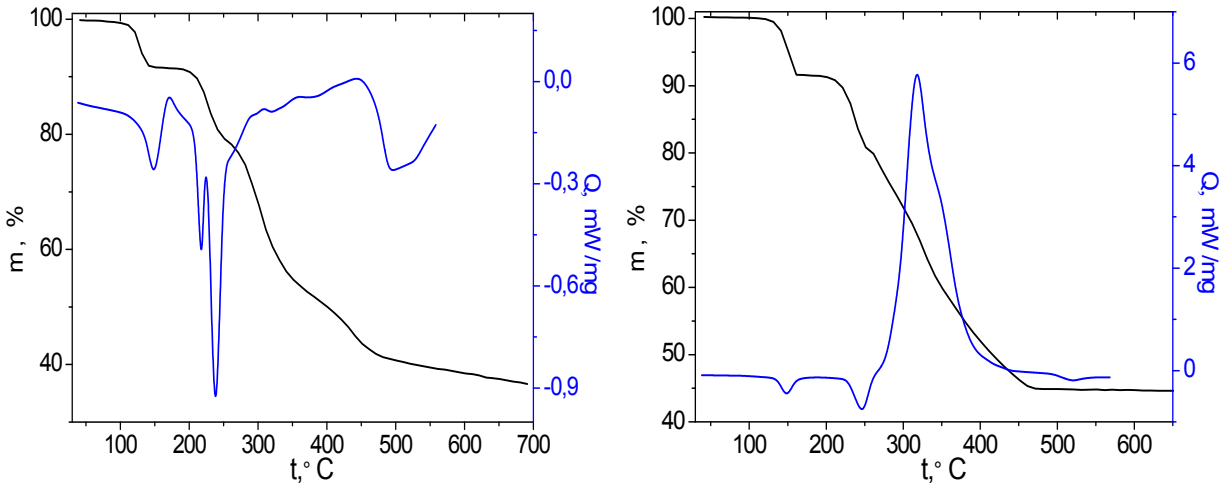

Fig. S1. Thermolysis of complex **1**: under argon (left), in air (right).

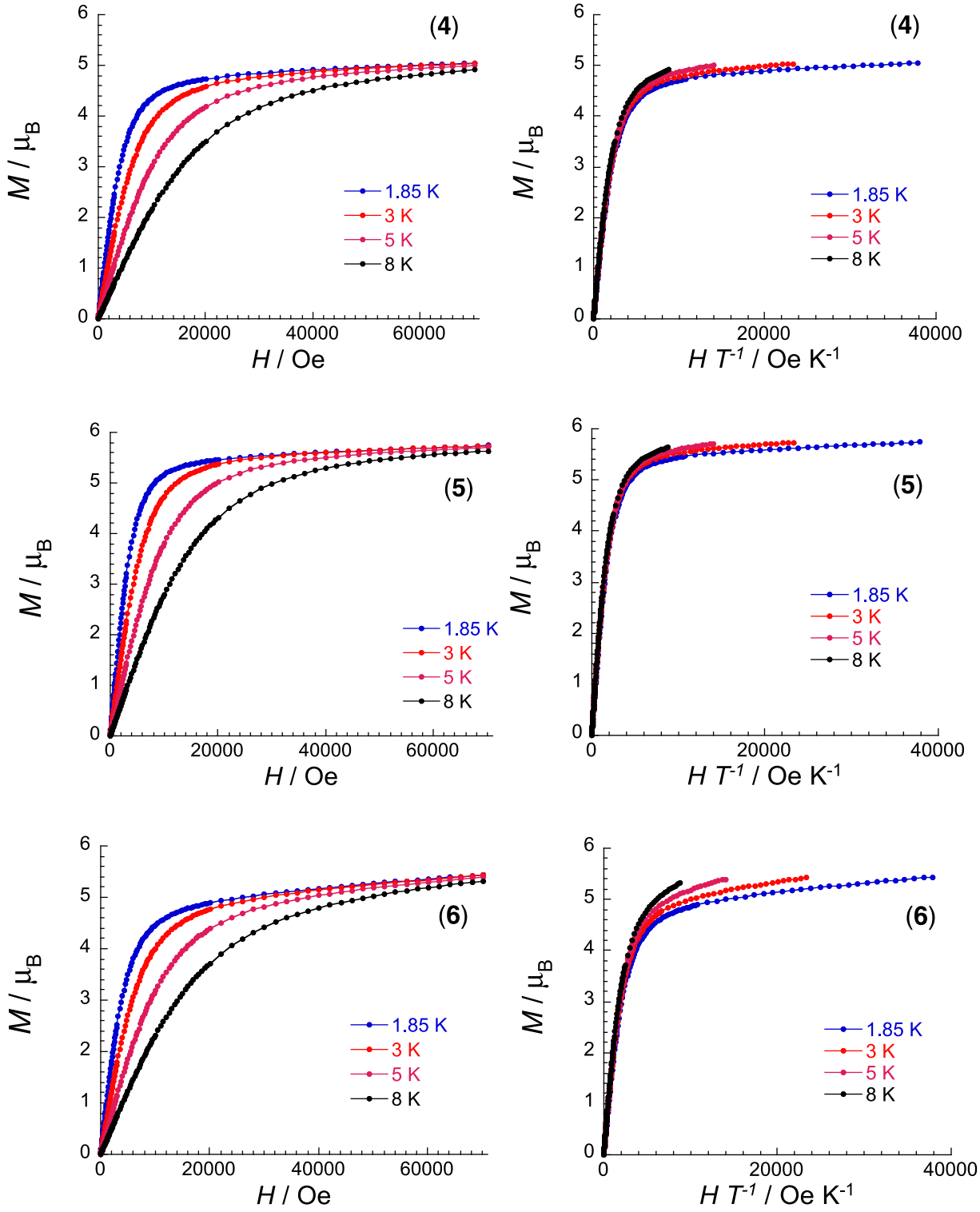

Fig. S2. Field dependences of the magnetization for complexes **4**, **5** and **6** (top, middle and bottom parts of the figure respectively) plotted as *M vs. H* (left) and *M vs. H/T* (right) below 8 K. Solid lines are guides.

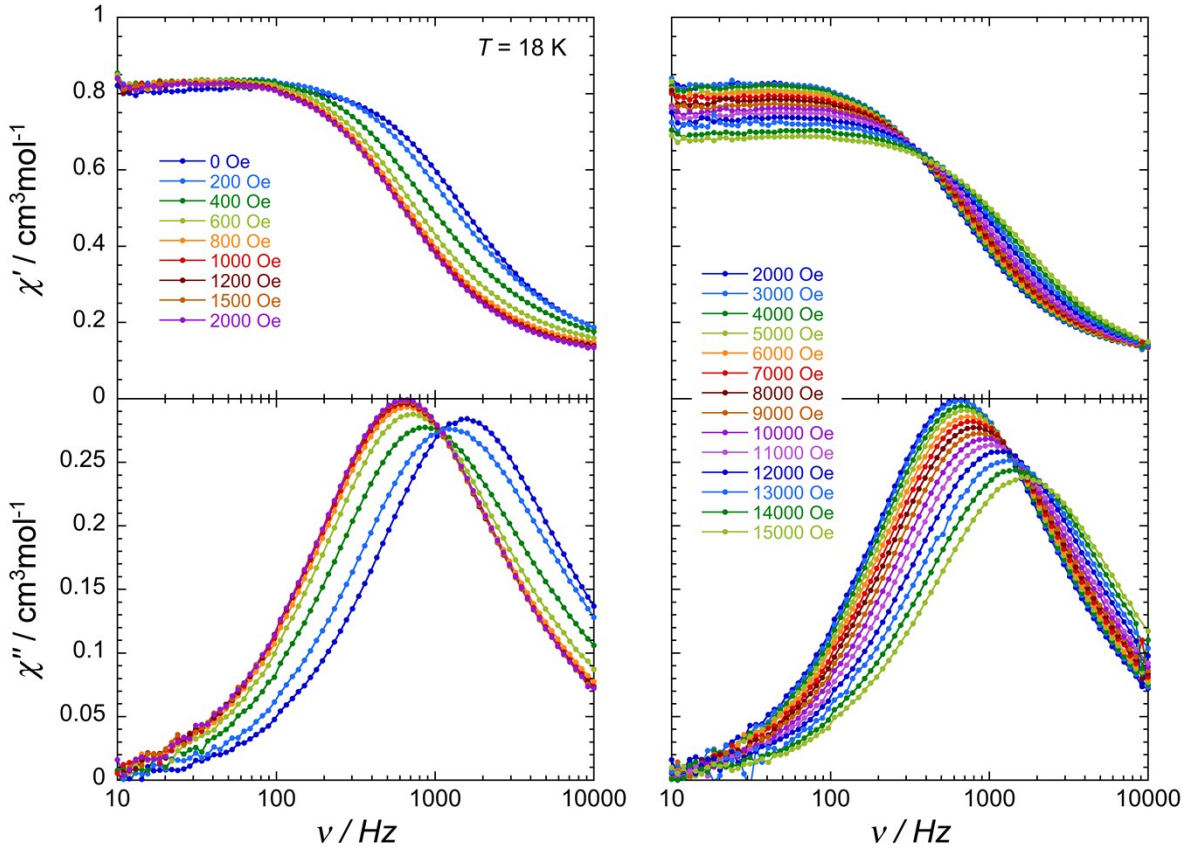

Fig. S3. Frequency dependences of the real (χ', top) and imaginary (χ'', bottom) parts of the *ac* susceptibility at 18 K with different *ac* frequency between 10 and 10000 Hz and different *dc*-field between 0 and 2000 Oe (left) and between 2000 and 15000 Oe (right) for a polycrystalline sample of compound **5**. Solid lines are guides.

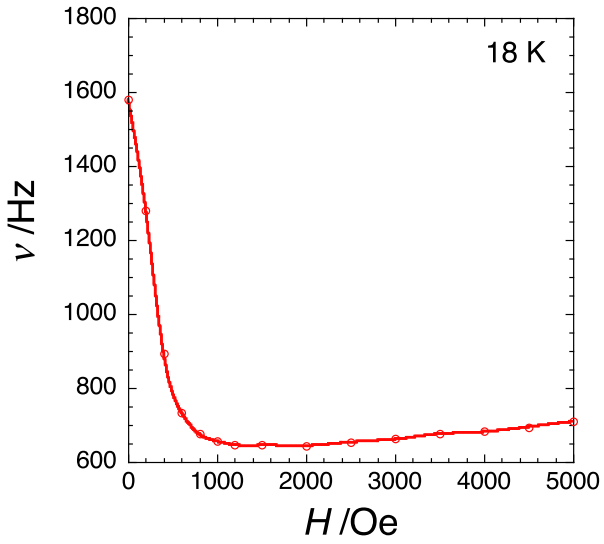

Fig. S4. Field dependence of the characteristic ac frequencies of the relaxation mode - from Figure S3 at 18 K for a polycrystalline sample of **5**. Solid lines are visual guides.

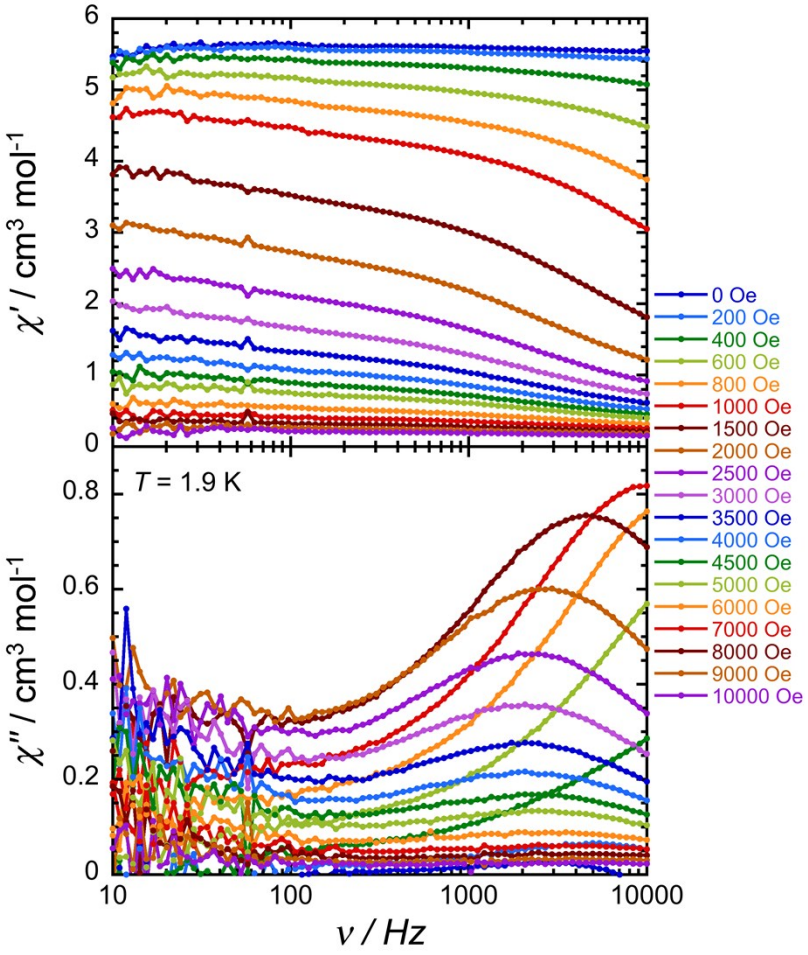

Fig. S5. Frequency dependences of the real (χ', top) and imaginary (χ'', bottom) parts of the *ac* susceptibility at 1.9 K with different *ac* frequencies between 10 and 10000 Hz and different *dc*-fields between 0 and 10000 Oe for a polycrystalline sample of **4**. Solid lines are guides.

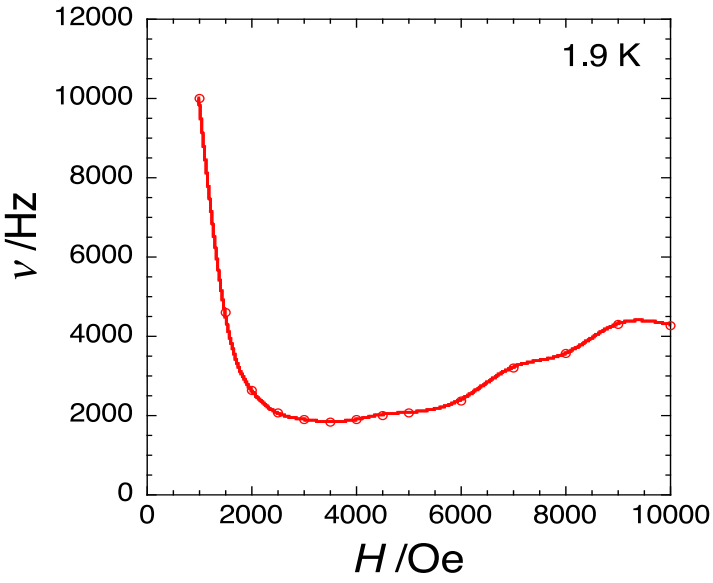

Fig. S6. Field dependence of the characteristic ac frequencies of the relaxation mode - from Figure S5 at 18 K for a polycrystalline sample of **4**. Solid lines are visual guides.

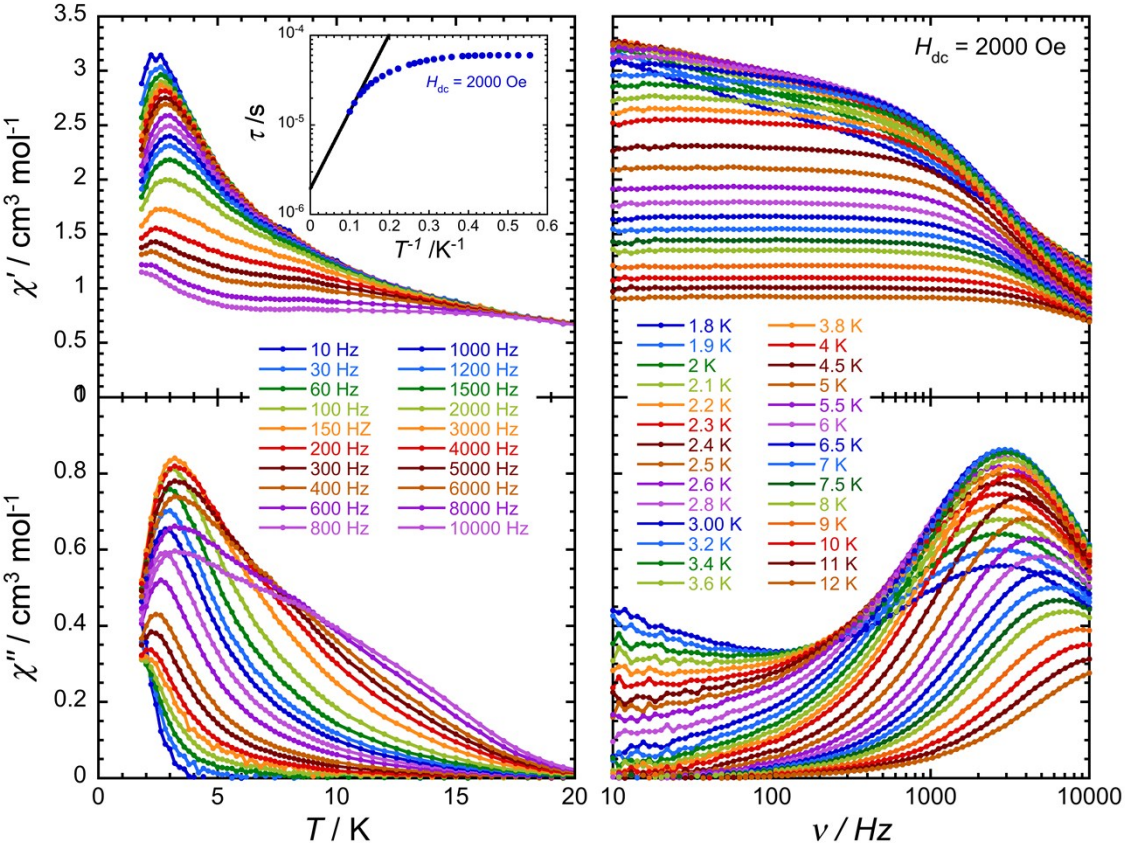

Fig. S7. Temperature (left) and frequency (right) dependences of the real (χ', top) and imaginary (χ'', bottom) parts of the ac susceptibility, between 10 and 10000 Hz and between 1.8 and 12 K respectively, for **4** in 2000-Oe dc field. Solid lines are visual guides. Inset: τ vs. T^{-1} plot for **4** in 2000-Oe dc-field. Solid black line is the best fit to the Arrhenius law.

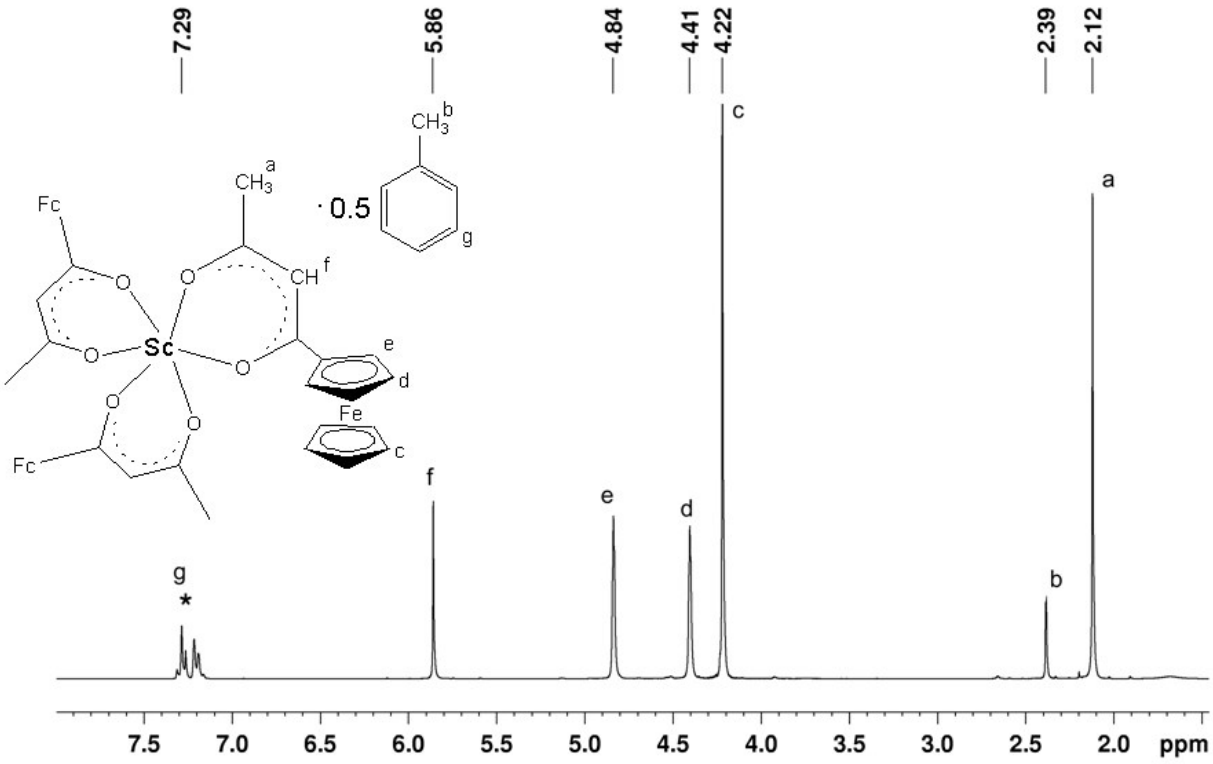

Fig. S8. ^{1}H NMR spectrum of complex **8** (300 MHz, $CDCl_3$). The signal of residual $CHCl_3$, which overlaps with the signal of phenyl, is marked by an asterisk.

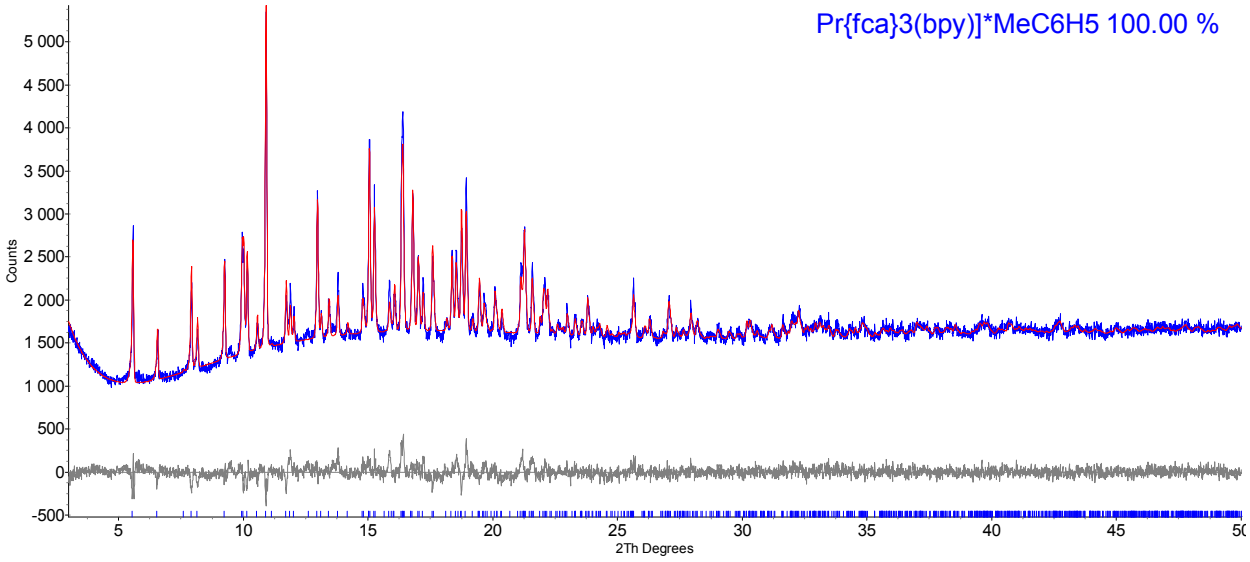

Fig. S9. X-ray Rietveld refinement profiles for $[Pr(fca)_3(bpy)]\cdot PhMe$ (**1**) recorded at room temperature. The red line is calculated profile, blue line is experimental profile. The bottom trace shows the difference curve. The vertical bars indicate the calculated positions of the Bragg peaks.