Supplementary Materials: Elaboration of Luminescent and Magnetic Hybrid Networks Based on Lanthanide Ions and Imidazolium Dicarboxylate Salts: Influence of the Synthesis Conditions.

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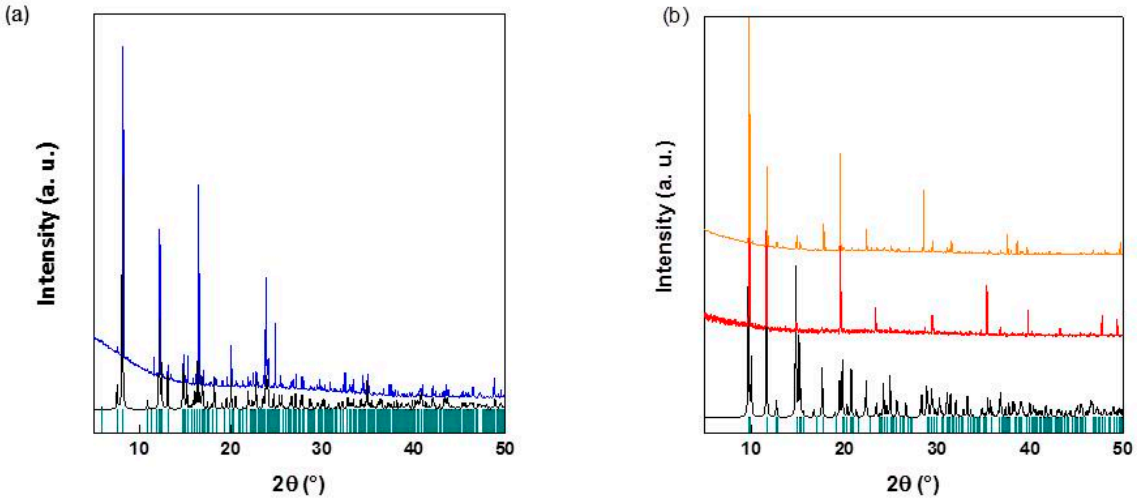

Figure S1. Comparison of the calculated pattern from single crystals X-ray data (black line) and of the experimental powder X-ray diffraction patterns for the compound **(a)** $[Nd_2(\mathbf{L})(ox)(NO_3)(H_2O)_3][NO_3]$ (blue line) and **(b)** $[Nd(\mathbf{L})(ox)(H_2O)]\cdot H_2O$ (red line) and $[Sm(\mathbf{L})(ox)(H_2O)]\cdot H_2O$ (orange line). The green vertical lines indicate the position of the calculated diffraction lines.

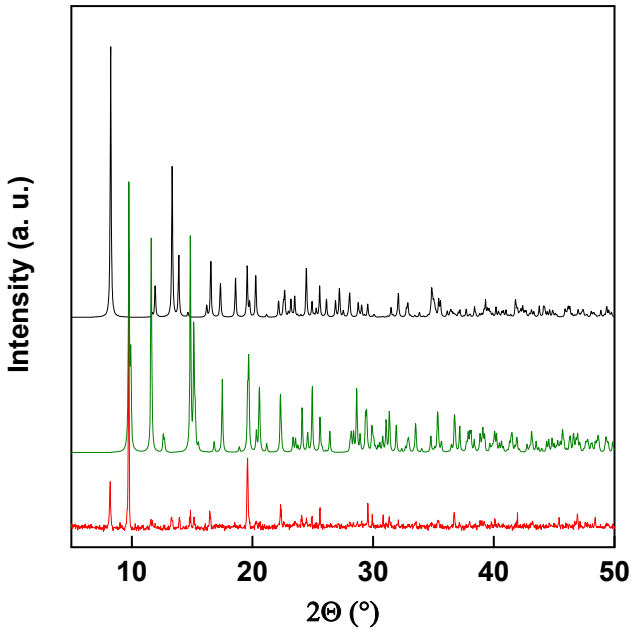

Figure S2. Comparison of the calculated patterns from single crystals X-ray data for $[Nd(\mathbf{L})(ox)_{0.5}(H_2O)_2][Cl]$ (black line) and $[Nd(\mathbf{L})(ox)(H_2O)]\cdot H_2O$ (green line) and of the experimental powder X-ray diffraction pattern (red line) of the sample coming from the reaction between $[H_2\mathbf{L}][Cl]$, $Nd(NO_3)_3\cdot 6H_2O$ and oxalic acid.

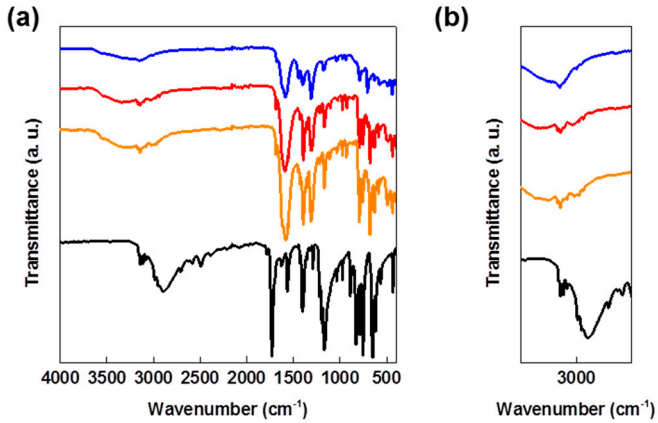

Figure S3. FTIR spectra of [Nd_2(**L**)(ox)(NO_3)(H_2O)$_3$][NO_3] (blue line), [Nd(**L**)(ox)(H_2O)]·H_2O (red line), [Sm(**L**)(ox)(H_2O)]·H_2O (orange line) and of [H_2**L**][Cl] (black line) **(a)** on the range between 4000 cm^{-1} and 400 cm^{-1} and **(b)** enlargement of the range between 3500 cm^{-1} and 2500 cm^{-1}.

The FTIR spectra of [H_2**L**][Cl] exhibits three bands at 3143 cm^{-1}, 3112 cm^{-1} and 3082 cm^{-1} characteristic of the stretching vibration of the aromatic C–H, two bands at 2987 cm^{-1} and 2952 cm^{-1} characteristic of the stretching vibration of the aliphatic C–H. The large band at 2896 cm^{-1} corresponds to the presence of H bondings between the chloride anion and the cycle of the imidazolium ligand and between the chloride anion and the carboxylic functions [1]. The intense band at 1735 cm^{-1} is characteristic of the carboxylic functions of the imidazolium salt [1,2].

The FTIR spectra of [Nd_2(**L**)(ox)(NO_3)(H_2O)$_3$][NO_3], [Nd(**L**)(ox)(H_2O)]·H_2O, [Sm(**L**)(ox)(H_2O)]·H_2O exhibit a first series of bands between 3200 cm^{-1} and 3000 cm^{-1} and a second between 3000 cm^{-1} and 2800 cm^{-1} which are characteristic of the stretching vibration of the aromatic and aliphatic C–H, respectively. In the region between 2000 cm^{-1} and 1000 cm^{-1}, the band at 1735 cm^{-1} is no visible anymore and instead new bands appears around 1550 cm^{-1} which correspond to the antisymmetric vibration of the carboxylate functions of the imidazolium salt and the oxalate ligand. It can be noted that the large band at 2896 cm^{-1} also disappears.

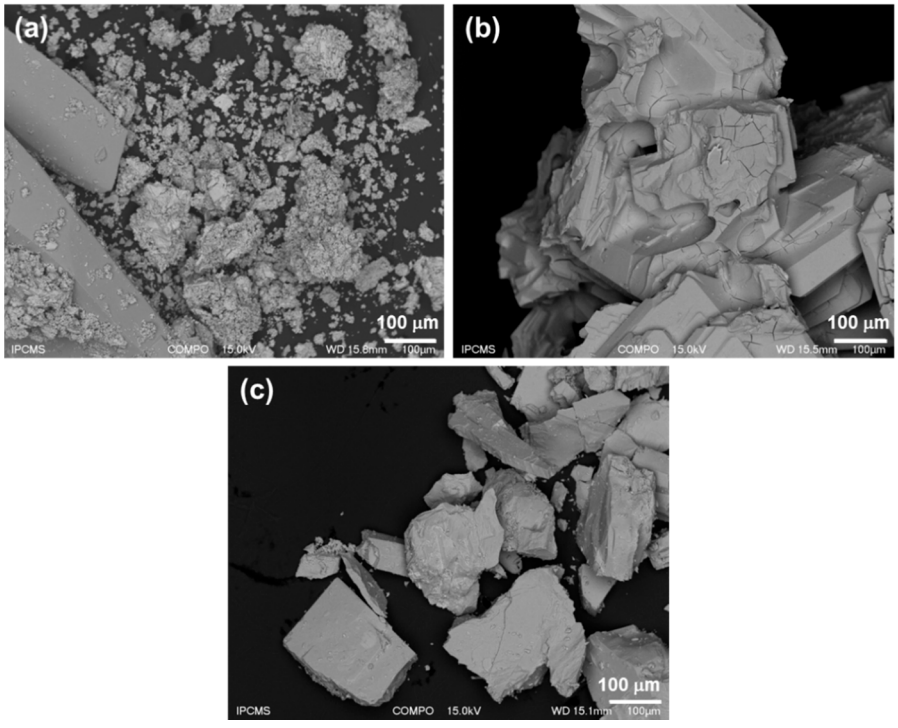

Figure S4. SEM images in composition for the compounds **(a)** [Nd_2(**L**)(ox)(NO_3)(H_2O)$_3$][NO_3], **(b)** [Sm(**L**)(ox)(H_2O)]·H_2O and **(c)** [Nd(**L**)(ox)(H_2O)]·H_2O.

References

1. Barczyński, P.; Komasa, A.; Ratajczak-Sitarz, M.; Katrusiak, A.; Huczyński, A.; Brzezinski, B. Molecular structure of 1,3-bis(carboxymethyl)imidazolium bromide and its betaine form in crystal. *J. Mol. Struct.* **2008**, *876*, 170–176.
2. Farger, P.; Guillot, R.; Leroux, F.; Parizel, N.; Gallart, M.; Gilliot, P.; Rogez, G.; Delahaye, E.; Rabu, P. Imidazolium dicarboxylate based metal–organic frameworks obtained by Solvo-Ionothermal reaction. *Eur. J. Inorg. Chem.* **2015**, *2015*, 5342–5350.