Evidence of spin crossover effect on photoluminescence properties of iron compound [Fe(naphtrz)$_6$-](tcnsme)$_2$.4CH$_3$CN

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Among the challenging quests in switchable molecular solids, the combination of spin crossover (SCO) phenomenon with fluorescence or luminescence phenomenon arising from a ligand directly attached to the SCO metal, constitutes a key objective in the study of the synergy between the change of electronic properties of the metal, subsequent to the SCO transition, and the emission properties of the fluorescent ligand. This strategy was adopted in only few cases in the literature[1,2,3], and clearly differs from that of the mixing of fluorescent molecules and bistable SCO entities[4,5]. In this context, we present the first example where the fifth ligands involved in the coordination of the SCO molecules are luminescent at room temperature[6], which enhances the coupling between the two properties conferred to this system. We investigated the photoluminescence (PL) and the magnetic responses as well as diffuse reflectivity to investigate the interplay between the SCO and the PL properties in the thermal region of the SCO transition. To well identify the synergy between the optical properties of the ligand and the SCO Fe(II) metal center, PL studies have been also performed on the pure ligand sample, whose structure was also determined. An excellent correlation was found between the magnetic and PL data, as displayed in Figure 1.

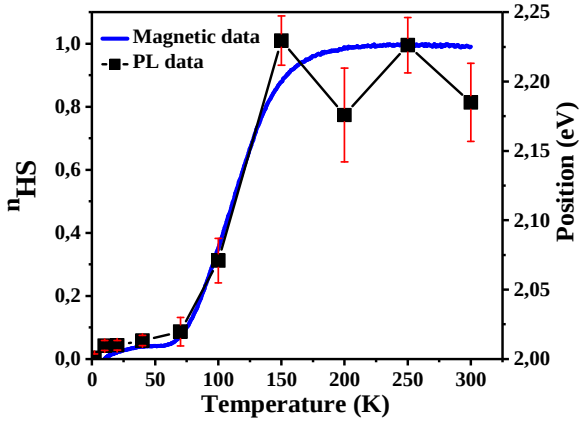


Figure 1: Correlation between PL (black line with square symbols) and magnetic (blue line) data of the SCO compound

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