Electronic supporting information

“Super hybrid tridentate ligands”: 4-substituted-2-(1-butyl-1H-1,2,3-triazol-4-yl)-6-(1H-pyrazol-1-yl)pyridine ligands coordinated to Fe(II) ions display above room temperature spin transitions†

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This supporting information contains:

| PXRD data of I, II, III and IV | S2 |
| FT-IR Spectra of I, II, III and IV | S11 |
| Elemental analysis of I, II, and III | S13 |

H & C NMR spectra of organic compounds | S4 |
PXRD Studies of I, II, III and IV:

Fig. S1. Represents theoretical and experimental PXRD patterns of [Fe$^{II}$($L_1$)$_2$(ClO$_4$)$_2$·CH$_3$CN] (I).

Fig. S2. Represents theoretical and experimental PXRD patterns of [Fe$^{II}$($L_1$)$_2$(BF$_4$)$_2$·CH$_3$CN] (II).
Fig. S3. Represents theoretical and experimental PXRD patterns of [Fe^{II}(L_3)_2](ClO_4)_2·CH_3OH (III).

Fig. S4. Represents theoretical and experimental PXRD patterns of [Fe^{II}(L_2)_2](ClO_4)_2·CH_3OH (IV).
$^1$H & $^{13}$C NMR spectra of synthesized compounds:

Figure S5: $^1$H NMR (400 MHz, CDCl$_3$) of 2

Figure S6: $^{13}$C NMR (100 MHz, CDCl$_3$) of 3
Figure S7: $^1$H NMR (400 MHz, CDCl$_3$) of 3

Figure S8: $^{13}$C NMR (100 MHz, CDCl$_3$) of 3
Figure S9: $^1$H NMR (400 MHz, CDCl$_3$) of 4

Figure S10: $^{13}$C NMR (100 MHz, CDCl$_3$) of 4
Figure S11: $^1$H NMR (400 MHz, CDCl$_3$) of L$_1$

Figure S12: $^{13}$C NMR (100 MHz, CDCl$_3$) of L$_1$
Figure S13: $^1$H NMR (400 MHz, CDCl$_3$) of 5

Figure S14: $^{13}$C NMR (100 MHz, CDCl$_3$) of 5
Figure S15: $^1$H NMR (400 MHz, CDCl$_3$) of L$_2$

Figure S16: $^{13}$C NMR (100 MHz, CDCl$_3$) of L$_2$
Figure S17: $^1$H NMR (400 MHz, CDCl$_3$) of L$_3$

Figure S18: $^{13}$C NMR (100 MHz, CDCl$_3$) of L$_3$
FT-IR Spectra of I, II, III and IV

Figure S19: FT-IR spectra of [Fe²⁺(L₁)₂(ClO₄)₂·CH₃CN (I)]

Figure S20: FT-IR spectra of [Fe³⁺(L₁)₂(BF₄)₂·CH₃CN (II)
Figure S21: FT-IR spectra of [Fe^{II}(L_3)_2](ClO_4)_2, CH_3OH (III)

Figure S22: FT-IR spectra of [Fe^{II}(L_2)_2](ClO_4)_2 (IV)
Elemental analysis of I, II and III:

**Figure S22.** Elemental analysis spectra of $[\text{Fe}^{II}(L_1)_2](\text{ClO}_4)_2\cdot\text{CH}_3\text{CN}$ (I)
Figure S22: Elemental analysis spectra of [Fe\textsuperscript{III}(L\textsubscript{1})\textsubscript{2}](BF\textsubscript{4})\textsubscript{2}·CH\textsubscript{3}CN (II)
Figure S22: Elemental analysis spectra of [Fe^{III}(L)_{2}](ClO_{4})_{2}, CH_{3}OH (III)