A new series of chiral porous molecular layered magnets with tunable $T_c$

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Here we will present the synthesis of a novel series of chiral molecule-based ferrimagnets obtained with di-substituted anilato ligands [$X_2C_6O_4$]$^{2-}$ ($X = H, Cl, Br, I$) and different cations, formulated as $A[M^{III}M^{II}(X_2C_6O_4)_3]G$ ($A^+ = NBu_4^+$, $\Delta -[(Phez)_3(H_3O)]^+$; $M^{III} = Cr$ and $Fe$; $M^{II} = Mn$, $Fe$, $Co$, ...; $X = H$, $Cl$, $Br$ and $I$; $G = CH_3COCH_3$, $H_2O$). This family of porous magnets presents void hexagonal cavities with ca. 291 Å$^3$ for $X = Cl$ (ca. 20% of the unit cell volume) where the solvent (G) molecules are located. Besides chirality and porosity this series present long range ferrimagnetic orderings with ordering temperatures of 5.5 to 6.3, 8.2 and 11.0 K for $X = Cl$, $Br$, $I$ and $H$, respectively. We will show the relationship between the electronegativity of the substituent group X and the ordering temperature, $T_c$. This series constitutes, thus, the first structurally and magnetically characterized series chiral porous molecule-based 2D magnets whose ordering temperatures can be easily tuned. Finally, we will present the great potentialities of these series of layered magnets for the preparation of multifunctional molecular materials by insertion of other cations with different functionalities as spin crossover.