Multifunctional Spin Crossover Compounds with Chiral Anions

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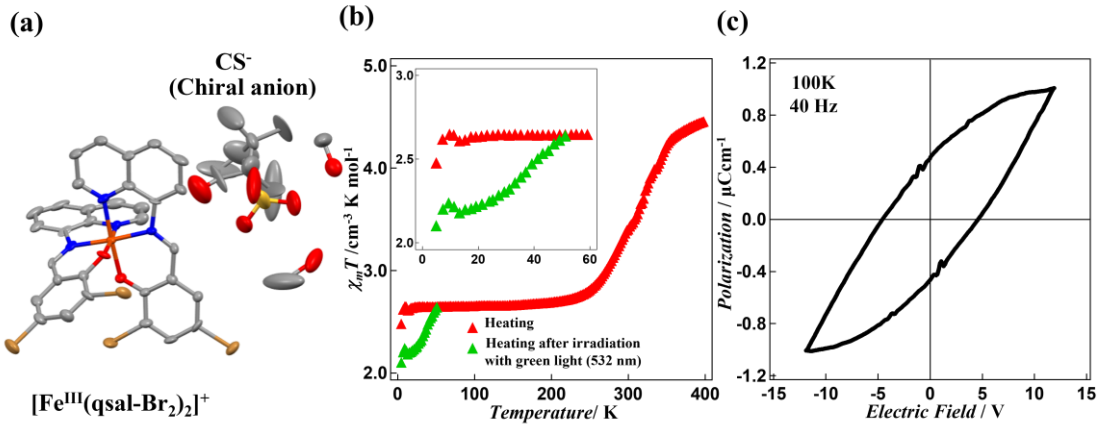
Multifunctional molecular materials exhibiting synergistic coexistence of two or more properties, have attracted a great deal of attention over recent years not only for their fundametal aspects but also because of their potential applications including information storage, sensors, spintronics and electro-optic devices. Spin crossover (SCO) compounds exhibiting switching between two different spin states are used as multifunctional molecular materials because of the ability to combine various properties such as luminescence and conduction properties.[1] Molecular functional materials exhibiting both SCO behavior and ferroelectric property maight show magnetoelectric (ME) effect that ferroelectricity can be controlled by magnetic field.[2] However, to the best of our knowledge, there is a general lack of reports concerned with the synthesis and investigation of such ferroelectric SCO compounds.

Herein, we aimed to construct a new ferroelectric SCO compound whose ferroelectric properties originated from the chiral anions. we synthesized an iron(III) complex, $[Fe^{III}(qsal\text{-}Br_2)_2](CS)\cdot 2MeOH$ (**1**·2MeOH; qsal-Br_2= 4,6-dibromo-2-(8quinolylimino)methylphenolate, CS=camphor-10-sulfonate)(Figure (a)). **1**·2MeOH assembles in the solid state *via* π–π interactions and halogen bond involving adjacent ligands to form 2D layered domains. **1**·2MeOH exhibited the SCO phenomenon of transitions between mixture spin states with a 6:4 ratio of high spin to high spin and low spin states, and at low temperatures exhibited the reverse light induced excited spin state trapping (LIESST) phenomenon after irradiation with green light (Figure (b)). In addition, the compounds showed PE curve with hysteresis loop (Figure (c)).



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