The single-molecule magnets (SMMs) are attracting the increasing interesting due to their potential applications in high density information storage, quantum computing, molecular spintronics, and magnetic refrigeration. This field provides scientists a possible access into the crossover of the classical and quantum world, and a wonderful model to study the fascinating magnetic properties between microscopic and macroscopic materials, such as slow magnetization relaxation and quantum tunneling effect. After the milestone discovery of the first single-molecule magnets (SMMs) Mn12ac, many new SMMs were structurally and magnetically characterized. The most studied systems are mainly traditional coordination compounds with polynuclear structures. However, for the difficulties in the control of magnetic anisotropy and exchange coupling interactions of the cluster-type molecules, Mn12ac molecule is still one of the most important SMMs with the high relaxation barrier. From 2011 [1-3], we explored an organometallic sandwich molecule, Cp*ErCOT(Cp* = pentamethylcyclopenta-dienide; COT = cyclooctatetraenide), which behaves as a single-ion magnets, into the field of molecular nanomagnets. It opened a door of SMMs to the chemists in organometallic chemistry. Recently, we found some new sandwich or half-sandwich lanthanide organometallic molecules could also show the slow relaxation of magnetization. We hope these systems can provide new understandings of slow magnetic relaxation and new clues on the design and synthesis of molecular nanomagnets. This work was supported by NSFC, the National Basic Research Program of China.


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