

Slow magnetic relaxation in hexacoordinated cobalt(II) field-induced single-ion magnets.

Autorzy

Anna Świtlicka
Barbara Machura
Mateusz Penkala
Alina Bieńko
Dariusz C. Bieńko
Jan Titiš
Cyril Rajnák
Roman Boča
Andrew Ozarowski

Rok wydania

2020

Czasopismo

Inorganic Chemistry Frontiers

Numer woluminu

7

Strony

2637-2650

DOI

10.1039/d0qi00257g

Kolekcja

Naukowa

Język

Angielski

Streszczenie

To gain a better insight into the factors affecting the enhancement of the energy barrier in single molecule (single ion) magnets, three hexacoordinate cobalt(II) complexes based on the tridentate ligand 2,6-bis(pyrazol-1-yl)pyridine (pypz) and pseudohalide ions have been synthesized and investigated. It was found that dicyanoamido and azido ligands act as bridges to form a one dimensional network based on a single $\mu_{1,5}$ -dca bridge $[\text{Co}(\text{pypz})(\text{dca})(\text{H}_2\text{O})\cdot\text{dca}]$ (**1**) and dimer $[\text{Co}_2(\text{pypz})_2(\mu_{1,1}\text{-N}_3)_2(\text{N}_3)_2]\cdot 2\text{CH}_3\text{OH}$ (**2**), while tcm^- counterbalanced the charge of $[\text{Co}(\text{pypz})_2]^{2+}$ in $[\text{Co}(\text{pypz})_2](\text{tcm})_2$ (**3**), where dca^- = dicyanamide ion; tcm^- = tricyanomethanide ion, respectively. The DC magnetic data show a sizable magnetic anisotropy, which was confirmed by high-field/high frequency EPR measurements. Two of them are SIMs (**1** and **3**) and the other one is a SMM (**2**). All complexes exhibit field induced slow magnetic relaxation with two (**1** and **2**) or three relaxation channels (**3**) and an exceptionally long relaxation time for the low-frequency channel upon application of an external field $B_{\text{DC}} = 0.4, 0.3, \text{ and } 0.4 \text{ T}$ at $T = 1.9 \text{ K}$; $\tau(\text{LF}) = 1.9, 2.1 \text{ and } 0.9 \text{ s}$, respectively. Additionally, the high spin-reversal barriers, $U = 103 \text{ K}$ for **1** and 95 K for **2**, are among the largest for field-induced SIMs for cobalt(II) reported in the literature.

Adres publiczny

<http://dx.doi.org/10.1039/d0qi00257g>

Strona internetowa wydawcy

<https://www.rsc.org/>

Artykuł

Plik został wygenerowany dnia 2026-10-12 08:35:32

Adres w repozytorium <https://old.chem.uni.wroc.pl/pl/repozytorium/uojinNr>.