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Editorial

Special Issue: A Themed Issue of Functional Molecule-Based Magnets: Dedicated to Professor Masahiro Yamashita on the Occasion of His 65th Birthday

Keiichi Katoh

Department of Chemistry, Graduate School of Science, Tohoku University, Aramaki-Aza-Aoba 6-3, Aoba-ku, Sendai 980-8578, Japan; keiichi.katoh.b3@tohoku.ac.jp

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Research on molecule-based magnetic materials was systematized in the 1980s and expanded rapidly. In Magnetochemistry, a special issue focusing on molecule-based magnetic substances has been published. However, the functionalities of those substances have grown daily, and researchers' quests does not seem to decline. This molecule-based magnetism has developed across many fields, including chemistry, physics, material chemistry, and applied physics, and the use of various functionalities of these molecule-based magnetic substances greatly influences the research on spin-based devices. This special issue is articulated around ten ordinal articles, in honor of Professor Masahiro Yamashita, who contributed greatly to this field, on the occasion of his 65th birthday.

First of all, Barbara Sieklucka will give an introduction to the scholarly achievements of Professor Masahiro Yamashita [1]. He has contributed a huge amount to the study of molecule-based magnets and strongly correlated electron system fields. Shinya Hayami and co-workers have investigated the promise of the pseudo pressure effects of the intercalation spin crossover (SCO) complex by using the transformation of graphene oxide (GO) to reduced graphene oxide (rGO) [2]. Their goal was to provide new insights into the study of pressure effects for molecule-based magnets in two-dimensional (2D) materials, such as graphene, BN, and MoS_2. Takashi Kajiwara, Yasutaka Kitagawa, and co-workers investigated the correlation between the f orbitals of Dy(III) ions and the $\sigma$and πorbitals of ligands to bring out the magnetic anisotropy [3]. These results indicated that the coordination geometry and molecular orbitals of Ln complexes should be considered when designing single-molecule magnets (SMMs). Ryuta Ishikawa and co-workers demonstrated the field-induced SMM properties of dinuclear Ln Kramers (Er and Yb) complexes with an electroactive chloralilate-bridging ligand [4]. Their goal was to able to reversibly switch SMM properties via an electrochemical approach. Dawid Pinkowicz and co-workers demonstrated that they could switch the magnetic properties of a Ni(II) coordination polymer under increased pressure [5]. This result indicates that mechanical force can be positively used for changing magnetic properties without physical collapse. Samia Benmansour, Carlos J. Gómez-García, and co-workers investigated the 2D structures of an MnCr honeycomb and observed long-range ferrimagnetic ordering upon changing the solvents [6]. These experimental results can be applied to the reversible switching of T_C (magnetic ordering temperature) by introducing and removing guest molecules. Constantina Papatriantafyllopoulou and co-workers investigated Co_2Ln clusters, which have a triangular metal geometry, and the Co_2Dy derivative exhibited an ac frequency dependence [7]. Mixed 3*d*/4*f* clusters might provide potential for SMM properties by using a uniaxial magnetic control. Vassilis Psycharis, Mark M. Turnbull, Spyros P. Perlepes, and co-workers demonstrated that the choice of ligand brings about the ability to form interesting structural types in 3*d* metal chemistry [8]. Their work demonstrated the flexibility of ligands and their utility in the synthesis of 3*d* metal complexes with interesting structures and properties. Keiichi Katoh, Masahiro Yamashita, and co-workers investigated

the relationship between the coordination geometry and magnetic relaxation phenomena for dinuclear Dy complexes [9]. These results demonstrate that precise control of the coordination environment enables control of the magnetic relaxation properties. Yasutaka Kitagawa, Masayoshi Nakano, and co-workers examined the possibility of intramolecular magnetic interactions in pyrazole-bridged dinuclear 3*d* metal complexes [10]. These results suggest that rational design guidelines for molecule-based magnets based on the quantum chemical calculation would be effective for modifying the interactions and properties of molecule-based magnetic materials.

I have put together a special issue on molecule-based magnets, "A Themed Issue of Functional Molecule-based Magnets: Dedicated to Professor Masahiro Yamashita on the Occasion of his 65th Birthday", and hope it will be of use to everyone. I wish to thank the authors for providing such impressive and interesting papers, and the referees and editorial staff who took the time to write valuable comments.

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