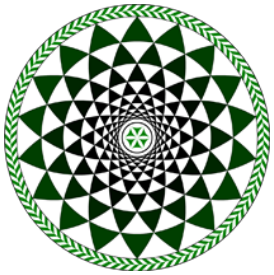

Contribution ID: **45** Type: **not specified**

Optical activity and switchable luminescence in octacyanido-based bimetallic layered magnets

Wednesday, July 8, 2015 12:50 PM (15 minutes)

Molecule-based magnets constructed of octacyanidometallates and complexes of 3d/4f metal ions are now attracting a considerable attention as they reveal the wide range of magnetic phenomena including ferromagnetism, metamagnetism, charge transfer or spin transitions, and slow relaxation of magnetization.^[1] The implementation of other physical functionalities, including chirality, luminescence, ionic conductivity, microporosity, or photoinduced phase transitions into magnetic octacyanido-based material results in extraordinary cross-effects, such as a magnetization-induced second harmonic generation, or photoswitchable second harmonic light, occurring when chirality is combined with photoinduced magnetic ordering.^[2,3] In this context, we focus on searching for new synthetic pathways towards [M(CN)₈]-bridged magnets with additional optical functionalities, which were found to be the most promising in the interactions with magnetic phenomena.^[3] Here, we present two novel types of two-dimensional bimetallic cyanido-bridged networks combining magnetic ordering with embedded optical functionalities: (a) chiral {[Mn^{II}(R-mpm)₂]₂[Nb^{IV}(CN)₈]}·4H₂O and {[Mn^{II}(S-mpm)₂]₂[Nb^{IV}(CN)₈]}·4H₂O (mpm = α-methyl-2-pyridine-methanol) ferrimagnets with T_c = 23.5 K revealing natural optical activity due to the chiral crystal structure, and magnetic optical acitivity in the presence of external magnetic field, with the strong enhancement in the magnetically ordered phase,^[4] and (b) {[Tb^{III}(Box)₂(dmf (Box = bis(oxazoline)) ferrimagnets with T_c = 2.4 K exhibiting visible green to red luminescence switchable by excitation light.^[5]

[1] B. Nowicka, T. Korzeniak, O. Stefanczyk, D. Pinkowicz, S. Chorazy, R. Podgajny and B. Sieklucka, Coord. Chem. Rev. 2012, 256, 1946. [2] S. Chorazy, K. Nakabayashi, K. Imoto, J. Mlynarski, B Sieklucka and S. Ohkoshi, J. Am. Chem. Soc. 2012, 134, 16151. [3] S. Ohkoshi, S. Takano, K. Imoto, M. Yoshikiyo, A. Namai and H. Tokoro, Nature Photonics 2014, 8, 65. [4] S. Chorazy, R. Podgajny, W. Nitek, T. Fic, E. Görlich, M. Rams and B. Sieklucka, Chem. Commun. 2013, 49, 6731. [5] S. Chorazy, K. Nakabayashi, S. Ohkoshi and B. Sieklucka, Chem. Mater. 2014, 26, 4072.

Primary author: Dr CHORĄŻY, Szymon (Department of Chemistry, The University of Tokyo)

Co-authors: Prof. SIEKLUCKA, Barbara (Faculty of Chemistry, Jagiellonian University, Kraków); Dr GORLICH, Edward (Institute of Physics, Jagiellonian University, Kraków); Dr NAKABAYASHI, Koji (Department of Chemistry, The University of Tokyo); Dr RAMS, Michał (Institute of Physics, Jagiellonian University, Kraków); Dr PODGAJNY, Robert (Faculty of Chemistry, Jagiellonian University, Kraków); Prof. OHKOSHI, Shin-ichi (Department of Chemistry, The University of Tokyo); Dr NITEK, Wojciech (Faculty of Chemistry, Jagiellonian University, Kraków)

Presenter: Dr CHORĄŻY, Szymon (Department of Chemistry, The University of Tokyo)

Session Classification: Molecular magnets

Track Classification: multifunctional materials