

MIXED-METAL COMPLEXES OF MIXED-VALENT DINUCLEAR RUTHENIUM(II,III) CARBOXYLATE AND TETRACYANIDONICKELATE(II)

Masahiro Mikuriya^{a*}, Yusuke Tanaka^a, Daisuke Yoshioka^a, and Makoto Handa^{b*}

^a Department of Chemistry and Research Center for Coordination Molecule-based Devices, School of Science and Technology, Kwansei Gakuin University, 2-1 Gakuen, Sanda 669-1337, Japan

^b Department of Chemistry, Interdisciplinary Graduate School of Science and Engineering, Shimane University, 1060 Nishikawatsu, Matsue 690-8504, Japan

*e-mail: junpei@kwansei.ac.jp, phone: (+81 795) 65 83 65; fax: (+81 795) 65 90 77

Abstract. Mixed-metal chain complexes constructed from lantern-type dinuclear ruthenium(II,III) carboxylate unit and tetracyanonickelate(II), $(\text{PPh}_4)_n[\text{Ru}_2(\text{O}_2\text{CCH}_3)_4\text{Ni}(\text{CN})_4]_n \cdot n\text{H}_2\text{O}$ (**1**) and $(\text{PPh}_4)_n[\text{Ru}_2\{\text{O}_2\text{CC}(\text{CH}_3)_3\}_4]_{3n}[\text{Ni}(\text{CN})_4]_{2n} \cdot 2n\text{H}_2\text{O}$ (**2**), were synthesized and characterized by elemental analysis, IR, and UV-vis spectroscopies. These data are in accordance with the formation of the chain complex with an alternative arrangement of the dinuclear Ru_2 unit and tetracyanonickelate(II). A broad band at near-IR and a band at visible region (1058 and 452 nm for **1** and 1082 and 454 nm for **2**) were observed in the diffused reflectance spectra and ascribed to a $\delta(\text{Ru}_2) \rightarrow \delta^*(\text{Ru}_2)$ and a $\pi(\text{RuO}, \text{Ru}_2) \rightarrow \pi^*(\text{Ru}_2)$ transitions, respectively. Temperature-dependence of magnetic susceptibility (4.5–300 K) showed that the antiferromagnetic interaction between the dinuclear units is weak ($zJ = -0.2 \text{ cm}^{-1}$) with D value of 75 cm^{-1} for both complexes.

Keywords: dinuclear ruthenium(II,III) carboxylate, magnetic property, mixed-metal complex, tetracyanonickelate(II).