

MS31-P03 | PHOTOCRYSTALLOGRAPHIC INVESTIGATIONS OF NEW NICKEL(II) NITRO COMPLEXES

Kutniewska, Sylwia Ewa (University of Warsaw, Warsaw, POL); Borowski, Patryk (University of Warsaw, Warsaw, POL); Kaminski, Radoslaw (University of Warsaw, Warsaw, POL); Jarzemska, Katarzyna (University of Warsaw, Warsaw, POL)

The design of solid-state materials, properties of which can be modified in a controllable way, is among challenges of modern materials science. Understanding of the physicochemical processes occurring in photoactive materials under light stimuli requires detailed knowledge of the related changes at different structural levels. In this contribution we present a photocrystallographic study of selected nickel(II) nitro complexes. Our investigations are focused on finding relationships between the material's structure features (crystal packing, intermolecular interactions, crystal lattice stability) and its behaviour (photoswitching properties - conversion percentage, structural changes' nature) when exposed to LED light, as the analysed compounds may undergo the photo-induced nitro group isomerisation. All of the studied complexes exist as a nitro isomer (Ni-N(O)₂) in the ground state and all of them switch to the nitrito form (Ni-O-NO) upon LED light irradiation. So far, compound 1 appeared to be the most promising photoswitchable system among the series. The IR spectroscopy results indicate in this case the 100% conversion level from the nitro ground-state form to the nitrito isomer after exposure to the 590nm LED light at 180K, while the metastable state exists up to around 240K. For the compound 2 similar photoisomerisation conditions were observed. After irradiation using the 660nm wavelength at 160K about 100% conversion was achieved. In turn, the crystal structure of 3 contains two complex molecules in ASU, out of which only one undergoes photoisomerisation, however, with a somewhat lower conversion level.

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