Poster Presentation

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Measurement of chiroptical properties of nickel sulfate hexahydrate with G-HAUP

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A crystal, which belongs to a lower crystal system than cubic one, exhibits optical anisotropies. The optical anisotropies originate from the difference in refraction and absorption between orthogonally linearly polarized lights. When molecules forming a crystal are enantiomers with the same chirality or form helical structures with the same handedness, the crystal shows chiroptical properties, which originate from the difference in refraction and absorption between right and left circularly polarized lights. The four optical phenomena are called linear birefringence (LB), linear dichroism (LD), circular birefringence (CB) and circular dichroism (CD), respectively. It had been difficult to measure CB and CD in chiral crystals with optical anisotropies because the signals of the anisotropies are three or four orders of magnitude larger than those of chiroptical properties. The Generalized High Accuracy Universal Polarimeter (G-HAUP) [1] enables us to simultaneously measure LB, LD, CB and CD of any anisotropic crystal. Nickel sulfate (NS) is achiral in the solution state. However, in the crystalline state, it forms hexahydrate and exhibits chirality since molecules are put in helical arrangements. The NS crystal belongs to an enantiomorphous space group, $P4_12_12$ or $P4_32_12$. Many researchers have reported the optical properties of NS crystal because large and good-quality crystals are readily grown. However, we consider the LB, LD, CB and CD in NS crystal should be simultaneously and completely investigated. The purpose of this study is to obtain LB, LD, CB and CD along the a axis with G-HAUP and compare the CB and CD with the results along the c axis. We measured optical rotatory power (ORP) along the c axis with G-HAUP, which agrees with the previous results [2,3]. We then prepared for some samples with chirality and anisotropy. We measured LB, LD, CB and CD spectra, respectively and will demonstrate the relation between their optical properties and structures.

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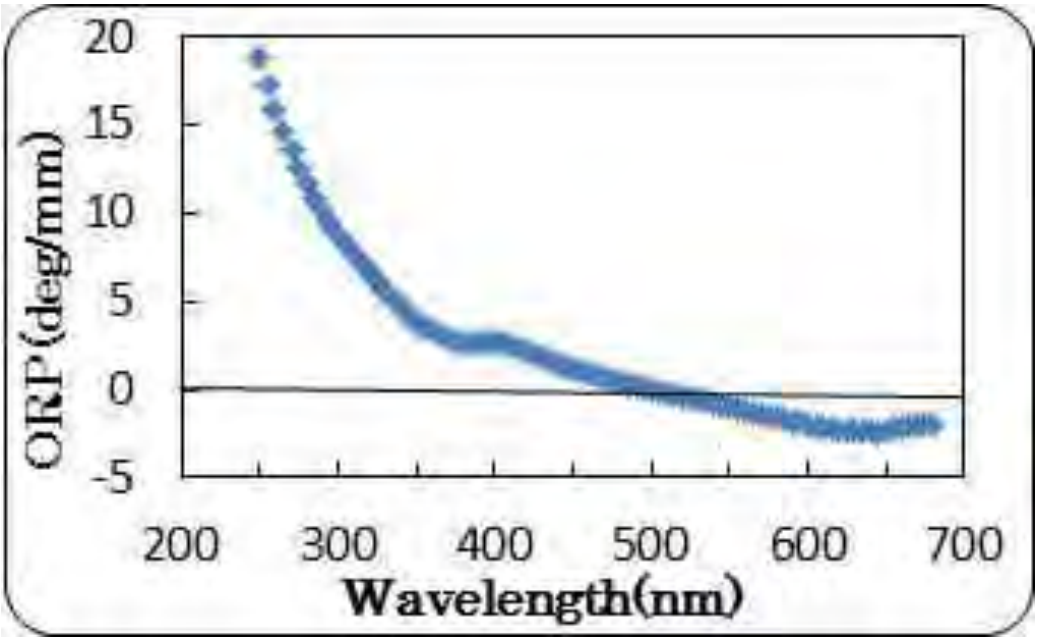

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