Poster Presentation

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Control of Photochromism in Crystalline-State in Dual Photoisomeric Complexes

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Photochromic materials have attracted attention in recent years, however, in situ control of the photochromic reactivities still challenging. In order to realize dynamic control of photochromic property in crystal, we designed and created new dual photoisomeric type cobaloxime complexes, in which the reactivity of photochromic ligand changes by contact with surrounding photoreactive ligands. In this study, salicylideneaniline derivatives (SAP) are used as photochromic ligands, and the relationships between their photochromic reactivity and structural changes induced by crystalline-state photoisomerization of alkyl group of cobaloxime complex were investigated. As a salicylideneaniline (SAP) type cobaloxime complex, (3-cyanopropyl)(N-(3,5-di-tert-butylsalicylidene)-3-aminopyridine)cobaloxime was successfully synthesized. In the crystal, the SAP moiety which had a twisted conformation (dihedral angle of rings, 30.0(6)°)showed the photochromism upon UV irradiation. Also the 3-1 photoisomerization of the 3-cyanopropyl group in the cobaloxime moiety occurred with retention of the single-crystal form upon visible light irradiation. After crystalline-state 3-1 photoisomerization of the alkyl group by visible light, the photochromic property was examined to show the lifetime of colored species became significantly longer than before the reaction. It would be explained that the reaction cavity around the SAP moiety was modified by solid-state photoisomerization of alkyl group of the surrounding cobaloxime complexes, which successfully enabled the control of the photochromism. Moreover, other several derivatives are investigated similarly and their results were discussed together.

Keywords: Photochromism, Crystalline-state reaction, Photoisomerization