三核金(I)錯体の結晶構造の光制御

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Photophysical Control of Crystal Structure of Trinuclear Gold(I) Complexes ([1]*Graduate School of Life Sciences, Ritsumeikan University*) ○Yosei Wakasa,[1] Kyohei Hisano,[1] Osamu Tsutsumi[1]

Gold(I) complexes show luminescence depending on the aggregation structure. A previous report revealed that the gold complexes change their crystal structure in the excited state due to the enhancement of the aurophilic interaction.[1)] Until now, we have reported the luminescence behavior of trinuclear gold complexes in crystals.[2)] In this study, we investigated effects of UV irradiation during the crystallization process. The single crystal of the gold complex was obtained by recrystallization from the THF solution. The crystallization was executed under irradiating UV light of 254 nm. The obtained crystal structure was investigated by single-crystal X-ray structure analysis and emission spectroscopy. The luminescence behavior of the crystals obtained under UV light irradiation showed completely different from that was obtained in dark, suggesting that the crystal structure changes during crystallization under UV light irradiation (Figure 2). We analyzed the structure of each crystal and discussed the mechanism by which the structural change was induced.

Keywords : Gold complexes, Aurophilic interaction, Crystal structure

金(I)錯体は親金相互作用に基づき凝集構造に依存した発光を示す。また，励起状態では親金相互作用が増強され，結晶構造が変化する例が報告されている[1)]。これまでにわれわれは，環状三核金錯体（Figure 1）の結晶中における発光挙動について報告した[2)]。本研究では，この金錯体の結晶化過程における紫外光照射の影響を調べた。THF 溶液から再結晶することで錯体の単結晶を得た。このとき，錯体の吸収波長である 254 nm の紫外光を照射しながら結晶化を行った。得られた結晶の構造を単結晶 X 線構造解析および発光スペクトル法により検討した。紫外光照射下で得られた結晶とは，暗所で得られた結晶とは全く異なる発光挙動を示し，紫外線照射を行いながら再結晶することで結晶構造が変化することが示唆された（Figure 2）。それぞれの結晶について構造解析を行い，構造変化が誘起されるメカニズムを考察した。

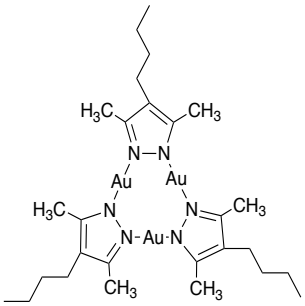

Figure 1. Molecular structure of Au complex used.

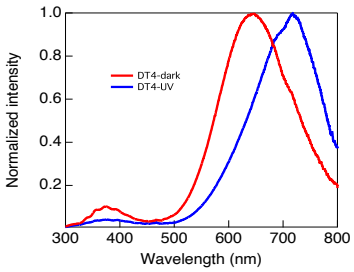

Figure 2. Emission spectra of sample UV and dark (λ_{ex} = 254 nm)

1) Seki, T.; Sakurada, K.; Muromoto, M.; Ito, H. *Chem. Sci.* **2015**, *6*, 1491.
2) Kuroda, Y,; Tamaru, M,; Nakasato, H.; Nakamura, K.; Nakata, M.; Hisano, K.; Tsutsumi, O. *Commun Chem*. **2020**, *3*,139.