

キラルな 1,4,7,10-テトラアザシクロドデカン骨格を有するテルビウム錯体の合成と構造および発光特性

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Synthesis, Structure, and Luminescence Properties of Terbium Complexes with a Chiral 1,4,7,10-Tetraazacyclododecane Skeleton (¹*Graduate School of Science and Engineering, Kindai University*) ○Hisaki Matsui,¹ Shunsuke Suga,¹ Hidetaka Nakai¹

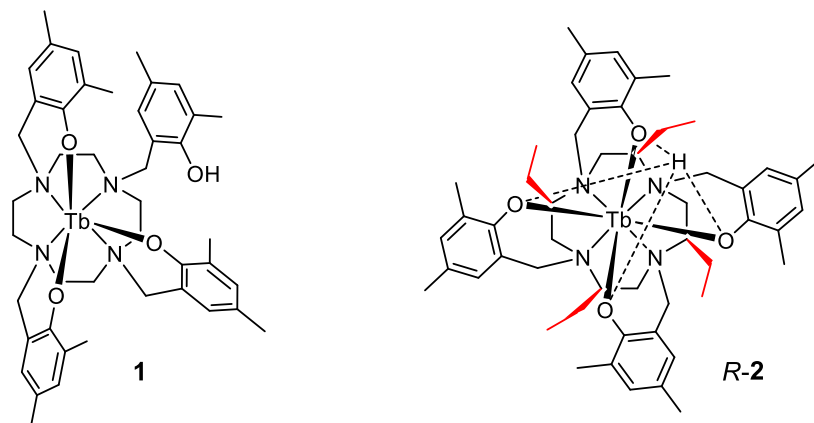
In our contributions to explore functional luminescent terbium(III) complexes, we have successfully found that a terbium(III) complex having an “achiral 1,4,7,10-tetraazacyclododecane (cyclen = C₈H₁₆N₄) skeleton” and phenyl groups, [$\{(^{\text{MeMe}}\text{ArOH})(^{\text{MeMe}}\text{ArO})_3\text{cyclen}\}\text{Tb}^{\text{III}}$] (**1**, (^{MeMe}ArO) = (CH₂C₈H₈O)), shows oxygen-sensitive luminescence properties with high luminescence quantum yield (91%) under N₂.¹

Intriguingly, we have now found that the introduction of chiral moieties into the cyclen skeleton changes the coordination structure of terbium. Herein, we report the synthesis, structure, and luminescence properties of new terbium(III) complexes with a “chiral cyclen skeleton (*R/S*-Et-cyclen = (2*R/S*,5*R/S*,8*R/S*,11*R/S*)-2,5,8,11-tetraethyl-cyclen = (C₂H₅)₄C₈H₁₂N₄)” and phenyl groups, [$\text{H}\{(^{\text{MeMe}}\text{ArO})_4\text{S/R-Et-cyclen}\}\text{Tb}^{\text{III}}$] (**R-2** and **S-2**).

Keywords : Terbium Complexes; Chiral; Luminescence

我々は、機能性の発光性テルビウム(III)錯体を探索する中で、「アキラルな1,4,7,10-テトラアザシクロドデカン(cyclen = C₈H₁₆N₄)骨格」とフェニル基を有するテルビウム(III)錯体[$\{(^{\text{MeMe}}\text{ArOH})(^{\text{MeMe}}\text{ArO})_3\text{cyclen}\}\text{Tb}^{\text{III}}$] (**1**, (^{MeMe}ArO) = (CH₂C₈H₈O))が、酸素応答性を示し、窒素下で高い発光量子収率(91%)を示すことを発見している¹⁾。

興味深いことに、最近、cyclen骨格にキラル部位を導入するとテルビウムの配位構造が変化することを見出した。本発表では、「キラルなcyclen骨格(*R/S*-Et-cyclen = (2*R/S*,5*R/S*,8*R/S*,11*R/S*)-2,5,8,11-tetraethyl-cyclen = (C₂H₅)₄C₈H₁₂N₄)」とフェニル基を有するテルビウム(III)錯体[$\text{H}\{(^{\text{MeMe}}\text{ArO})_4\text{S/R-Et-cyclen}\}\text{Tb}^{\text{III}}$] (**R-2** and **S-2**)の合成と構造および発光特性を報告する。



1) H. Nakai, K. Nonaka, T. Goto, J. Seo, T. Matsumoto, S. Ogo, *Dalton Trans.* **2015**, 44, 10923.