

カンファー骨格を含むβ-ジケトナト配位子を導入したキラルユウロピウム錯体の光物性

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Chiral molecules exhibit circularly polarized luminescence (CPL), which is characterized by the differential luminescence intensity of right- and left-handed circularly polarized light^[1]. The luminescence dissymmetry factor (g_{CPL}) defined as $g_{\text{CPL}} = 2 \times (I_{\text{L}} - I_{\text{R}}) / (I_{\text{L}} + I_{\text{R}})$, where I_{L} and I_{R} are the luminescence intensities of left- and right-hand circularly polarized light, respectively. Recently, a luminescent film with large g_{CPL} value ($= 1.2$) was reported using a chiral Eu(III) complex^[2]. In this study, we report on novel luminescent films composed of two types of chiral tetrakis Eu(III) complexes (Fig. 1, TEA[Eu(-tfc)₄] ($g_{\text{CPL}} = +1.54$ in CHCl₃) and TEA[Eu(+pfc)₄] ($g_{\text{CPL}} = +1.28$ in CHCl₃))^[3]. The mixed film (TEA[Eu(-tfc)₄] : TEA[Eu(+pfc)₄] = 1 : 2) provides the largest g_{CPL} value in solid state ($= +1.58$).

Keywords : Luminescence, Chiral, Europium, Camphor, 4f-4f Transition

円偏光発光(CPL)はキラル分子が発光する際に左円偏光と右円偏光に強度差が生じる現象である^[1]。左右円偏光強度の偏りは異方性因子($g_{\text{CPL}} = 2 \times (I_{\text{L}} - I_{\text{R}}) / (I_{\text{L}} + I_{\text{R}})$)によって評価される。ここで I_{L} と I_{R} はそれぞれ左円偏光強度と右円偏光強度である。近年、大きな $|g_{\text{CPL}}|$ 値($=1.20$)を示すキラルな Eu(III)錯体膜が報告された^[2]。本研究ではさらに大きな g_{CPL} 値を示す発光膜の創成を目的とし、二種のテトラキス型キラル Eu(III)錯体(Fig. 1, TEA[Eu(-tfc)₄] ($g_{\text{CPL}} = +1.54$ in CHCl₃)と TEA[Eu(+pfc)₄] ($g_{\text{CPL}} = +1.28$ in CHCl₃)^[3])混合膜を合成し、その光物性について評価した。その結果、混合膜 (TEA[Eu(-tfc)₄] : TEA[Eu(+pfc)₄] = 1 : 2)において固体条件における最大の g_{CPL} 値($= +1.58$)が観測された。

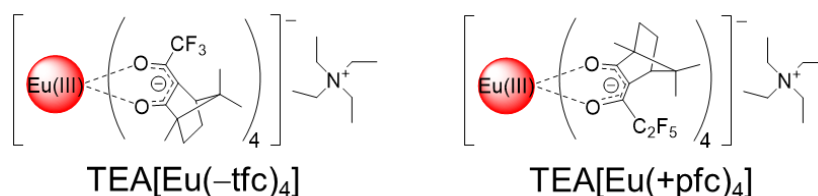


Fig. 1 Chemical structures of tetrakis chiral Eu(III) complexes.

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