

## ベンゾトリアゾール系紫外線吸収骨格を付与した青色蛍光性 1,8-ナフタルイミド誘導体の合成と耐光性評価

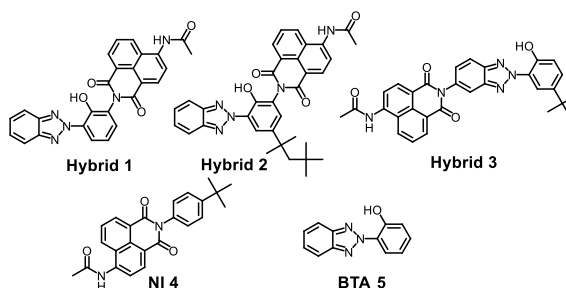
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 Synthesis of blue fluorescent 1,8-naphthalimide derivatives combined with benzotriazole ultraviolet absorbers and evaluation of their light resistances (<sup>1</sup>SHIPRO KASEI KAISHA, LTD.,  
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2-(2-hydroxyphenyl)-2H-benzotriazole derivatives (BTA) can be used as UV absorbers that suppress photo-excitation and photo-degradation of polymeric materials. BTAs are durable against UV light due to ultrafast nonradiative deactivation caused by excited-state intramolecular proton transfer (ESIPT). A series of 1,8-naphthalimide derivatives (NI) shows strong blue fluorescence and modest light resistance. In this work, we synthesized NI bearing BTA components to develop durable blue emitting organic materials (Fig. 1). The hybrid compounds (NI-BTAs) showed excellent blue fluorescence emission in solution and in polymer matrices. The durability test against UV light indicated that light resistances of hybrid compounds were higher than that of parent NI (**NI4**) (Fig. 2). Although **NI4** exhibited delayed fluorescence as well as phosphorescence in toluene at 77 K, the delayed fluorescence of NI-BTA was suppressed in the same measurement condition. It suggested that BTA units affected not only light resistance but also the deactivation process including the reverse intersystem crossing from triplet excited states of the NI unit.

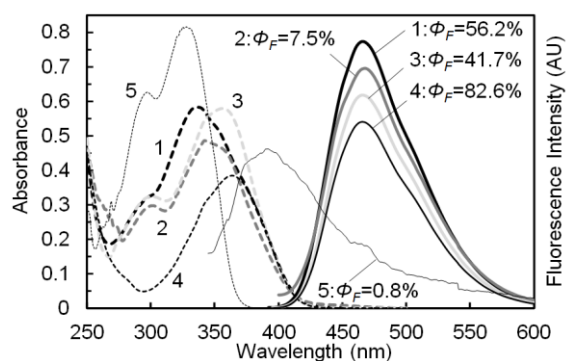
**Keywords** : Benzotriazole; Naphthalimide; Phosphorescence; Light Resistance

2-(2-ヒドロキシフェニル)-2H-ベンゾトリアゾール誘導体 (BTA) は、紫外線による高分子材料の光励起や光劣化を抑制する紫外線吸収剤として使用でき、励起状態分子内プロトン移動 (ESIPT) による超高速の無放射失活により、高い耐光性を示す。一方、1,8-ナフタルイミド誘導体 (NI) は強い青色蛍光を示すが、耐光性は低い。本研究では、高耐光性の青色発光有機材料を開発するために、BTA 成分を有する NI を合成した (Fig. 1)。

これらのハイブリッド化合物は、溶液中およびポリマーマトリックス中で優れた青色蛍光を示し、NI 単体 (**NI4**) よりも高い耐光性を示した (Fig. 2)。**NI4** はトルエン中 77K で遅延蛍光とりん光を示したが、ハイブリッド化合物では同じ測定条件で遅延蛍光が抑制された。このことから、BTA 部位が耐光性の向上だけでなく、NI 部位の三重項励起状態からの逆項間交差を含む失活過程に影響を与えることが示唆された。



**Fig. 1** Studied hybrid compounds.



**Fig. 2** UV-Vis absorption spectra (dot-line) and fluorescence spectra (solid line) of 1-5 in MeOH.