

## Effects of Monodentate Ligands on Stimuli Responsiveness of Pyridylenolate Complexes of Group 13 Elements

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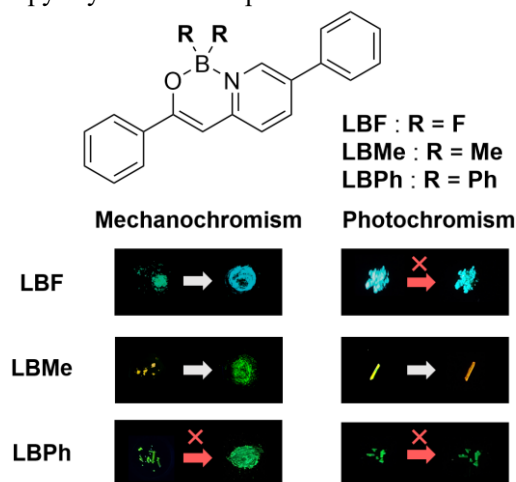
**Keywords:** Group 13 Complex; Stimuli Responsiveness; Emission; Boron; Gallium

Stimuli-responsive luminescent materials, which change their emission intensity and/or color in the response to external stimuli such as force, light, and vapor, can clearly visualize the difference in the molecular micro-environment. Thus, the materials have been applied as chemical sensors. We have reported that various group 13 complexes with bidentate  $\pi$ -conjugated ligands showed stimuli responsiveness.<sup>[1,2]</sup> It was demonstrated that the structural modifications at the bidentate ligands strongly affected their chromic behavior. In contrast, the effects of monodentate ligands have not been studied since the ligands protrude from the  $\pi$ -conjugated system and seemed to contribute slightly to the optical properties. Herein, we found that the stimuli responsiveness of the boron pyridylenolate complexes depended significantly on the monodentate ligands in this work (Scheme 1 and Figure 1). Interestingly, the introduction of methyl groups as the monodentate ligands afforded multi-stimuli responsive luminescence (Figure 2).

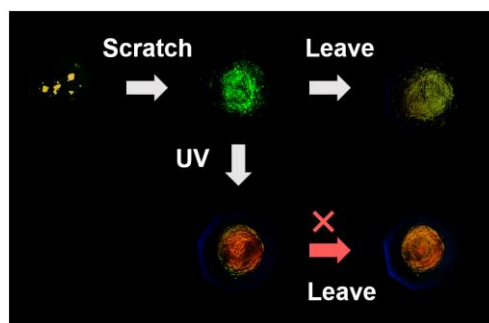
We synthesized the boron pyridylenolate complexes with various monodentate ligands, such as fluorine, methyl, and phenyl groups (Scheme 1). Comparing their photophysical properties in solid states, their chromic behavior depended on the substituents (Figure 1). It was reported that **LBF** showed mechanochromism.<sup>[2]</sup> **LBMe** exhibited photochromism as well as mechanochromism. In contrast, **LBPh** did not show such chromisms. We will discuss the effects of monodentate ligands on the chromisms in detail.

- 1) Chujo, Y. *et al. Mater. Chem. Front.* **2020**, 4, 1781–1788.
- 2) Chujo, Y. *et al. Eur. J. Org. Chem.* **2017**, 5191–5196.

**Scheme 1.** Chemical structures of boron pyridylenolate complexes



**Figure 1.** Chromic luminescence of **LBF**, **LBMe**, and **LBPh**



**Figure 2.** Various chromisms of **LBMe**