

# Photophysical Properties of Aluminum Dihydride Complexes based on $\beta$ -Diketiminato Ligands by Substituent Effect

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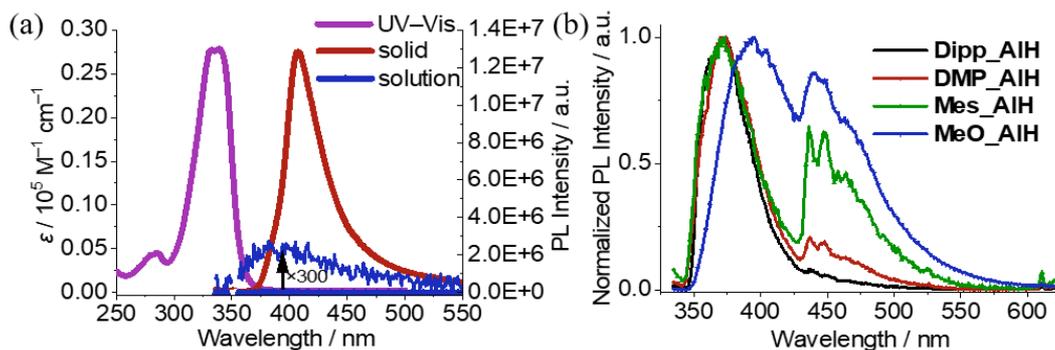
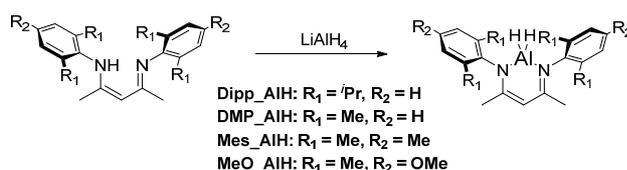
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Solid-state luminescent molecules have attracted great deal of attention as key components of luminescent devices such as organic light-emitting diodes, organic lasers, and chemosensors. Typical luminescent molecules usually lose their efficient luminescence at the solid states due

to strong intermolecular interactions. Meanwhile, we have reported that a series of  $\beta$ -diketiminato complexes of the group 13 elements show dramatic emission enhancement by crystallization compared to their solutions, namely crystallization-induced emission (CIE). Furthermore, these molecules also exhibit phosphorescence at 77 K.<sup>1,2</sup> Consequently, these complexes could serve as robust scaffolds for achieving functional luminescent materials. However, structure–property relationships in their photophysical properties have not been clarified completely. Herein, we synthesized a new series of aluminum dihydride complexes with different aromatic substituents (Scheme 1) and evaluated their photophysical properties.

All aluminum complexes showed the CIE property at room temperature like previously reported  $\beta$ -diketiminato complexes (Figure 1a). Photoluminescence spectra of their solutions at 77 K were composed of two distinct bands, fluorescence and phosphorescence (Figure 1b). The relative phosphorescence intensity to fluorescence increased in the order of Dipp < DMP < Mes < MeO. In the presentation, we will discuss such photophysical properties in detail.

**Scheme 1.** Synthetic scheme of aluminum dihydride  $\beta$ -diketiminato complexes



**Figure 1.** (a) UV–vis absorption and photoluminescence (PL) spectra of **MeO\_AIH** in a 2-methylpentane solution and the solid states. (b) Normalized PL spectra of  $\beta$ -diketiminato aluminum complexes in 2-methylpentane solutions ( $1 \times 10^{-5}$  M) at 77 K.

## References

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- (2) Ito, S.; Tanaka, K.; Chujo, Y. *Inorganics* **2019**, *7*, 100.