

Synthesis, Structure, Reactivity, and Solid-State Properties of Dialumanes and Trialumanes

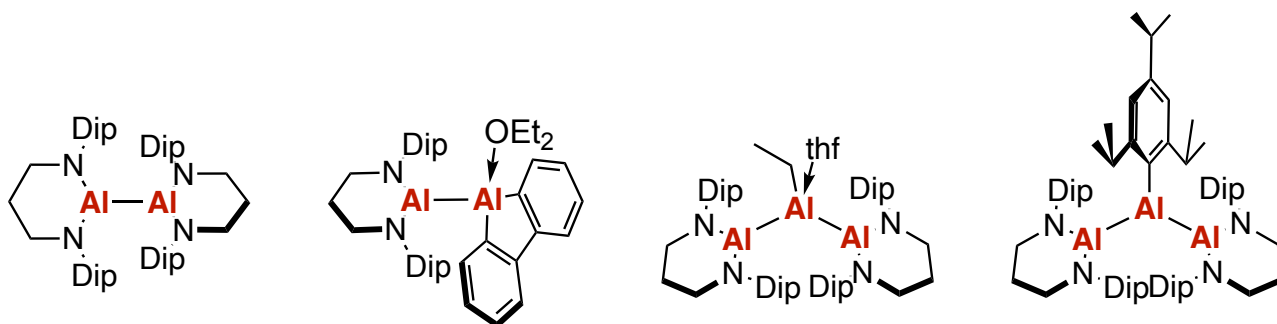
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Stable organic radicals have been widely used in the molecular design of the multi-step electron transfer materials, because of their multi-step redox processes involving the open-shell radicals and the corresponding closed-shell ionic species.¹

Nitroxide complexes **2** were synthesized via the Hartwig-Buchwald coupling reaction of boron complex **1** with diarylamines (**Scheme 1**).² Complexes **2** exhibited two-step one-electron oxidation processes attributable to the oxidations to the radical **3** and oxoammonium **4**. Chemical oxidation of **2** with Magic Blue afforded radical cation complexes **3**, which exhibited strong NIR-II absorptions extended to 1300 nm.



Scheme 1. Dialumanes and trialumanes in this study.

References

1. J. A. Bogart, H. B. Lee, M. A. Boreen, M. Jun, E. J. Schelter, *J. Org. Chem.* **2013**, *78*, 6344-6349.
2. M. Nakamura, R. Hyakutake, H. Fukumoto, T. Agou *et al.*, *Dalton Trans.* **2022**, *51*, 13675-13680.

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Ryotaro Yamanashi received his bachelor and master degree from Nagoya University in 2019 and 2021 under the supervision of Prof. Makoto Yamashita (Nagoya University). Currently, he is a Ph.D. student in Nagoya University and a JSPS research fellow (DC1).