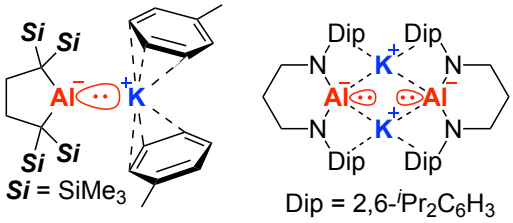
Synthesis and Properties of Aluminum-Containing Intermetallic Bonds

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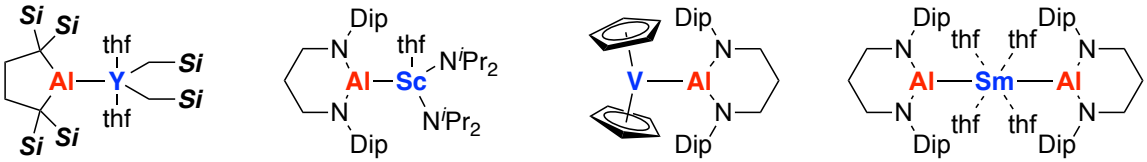
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Aluminum contains three valence electrons and is the most electropositive element in the p-block. Examples of synthesizing transition-metal complexes with a three-coordinated aluminum ligand remain limited. They can be classified to the following methods: (a) A nucleophilic attack of anionic transition-metal complexes to an aluminum electrophile, (b) the coordination of a base-stabilized Al(I) species to a metal, (c) elimination of alkane via a metathesis reaction, (d) an oxidative addition of an Al–H bond to a metal center in a low oxidation state, (e) insertion of Al(I) species into a metal-halogen bond, and (f) transmetallation of the Al anions to metal halides. In the presentation, our latest contribution to the chemistry of early transition metal-aluminum complexes using the method (f) will be discussed.[1]

Nucleophilic Al anions developed by our group



Novel Al–early metal bonds prepared from Al anions



The first Al–Y bond
visible absorption
without π- and d-electrons

The first Al–Sc bond
dialumination
of benzene

The first Al–V bond
catalytic alumination
of alkenes

The first Al–Sm bond
formation of Al_2C_4 ring
from ethylene

References

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