

Opening a New Field in Organic Synthesis with Theoretical and Physical Chemistry

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Tools for chemo-, regio- and stereo-selective introduction of various functional groups onto organic molecules are still quite limited in their applicability. Our new approaches to functionalizing organic compounds by means of development of the chemistry of organo ate complexes will be presented.

Organometallic reagents having Lewis acidity (such as dialkylzincs) often form complexes with anion species (such as alkyllithiums) to generate ate complexes (such as lithium trialkylzincates). Since all of ligands coordinated to Zn are usually the same (homoleptic), these reactivities, *i.e.*, the magnitude of the transference aptitude of ligands, are essentially equivalent. However, the reactivities of the ligands should be nonequivalent, if different ligands do coordinate to Zn (heteroleptic). Such heteroleptic zincates and their practical applications for organic transformations has been investigated and discussed theoretically based on computational methods.