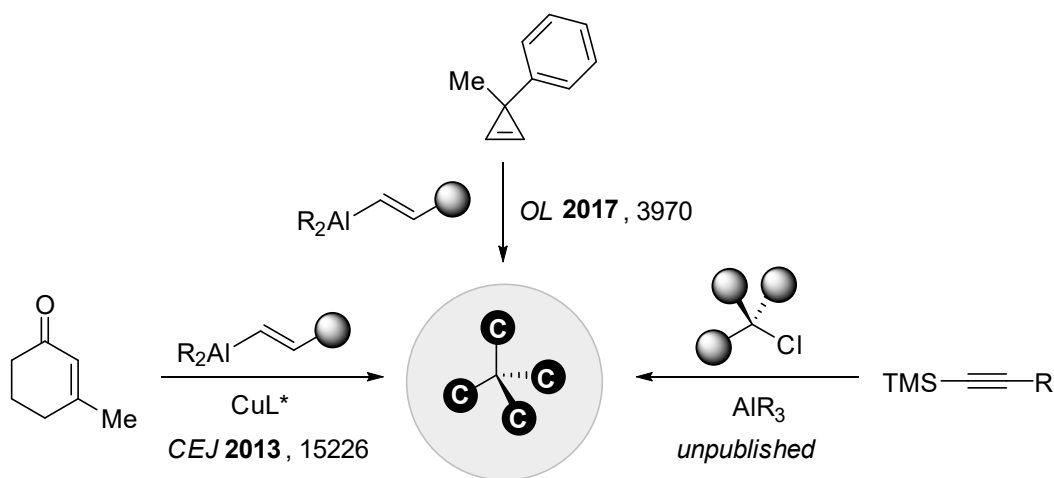


## Chameleon Chemistry:

## Unveiling the Dual Nature of Triorganoaluminum Compounds as Nucleophiles, Lewis Acids, or Both!

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Aluminum, an earth-abundant metal, exhibits a remarkable chemistry with diverse applications. The distinguishing feature of aluminum-based reagents lies in the high Lewis acidity of their metal center, attributed to the exceptionally strong aluminum-oxygen or aluminum-chloride bond (with bond energies of 138 kcal/mol and 118 kcal/mol, respectively).<sup>[1]</sup> Consequently, alanes demonstrate amphoteric behavior, where the aluminum atom can act as a Lewis acid center, while the anionic alkyl ligands serve as bases or nucleophiles. This unique property has been harnessed for a range of reactions, including conjugate additions, carbometalations, and Friedel-Crafts-type reactions.<sup>[2-3]</sup> These reactions, though employing different approaches, share a common theme of utilizing aluminum to construct all-carbon quaternary (stereo) centers.

**Construction of All-Carbon Quaternary (Stereo)centers***References :*

- [1] <https://labs.chem.ucsb.edu/zakarian/armen/11---bonddissociationenergy.pdf> [2] D. S. Müller, A. Alexakis *Chem. Eur. J.* **2013**, *19*, 15226-15239. [10.1002/chem.201302856]. [3] D. S. Müller, V. Werner, S. Akyol, H. G. Schmalz, I. Marek, *Org. Lett.* **2017**, *19*, 3970-3973 [10.1021/acs.orglett.7b01661]

