

CO₂ FIXATION AND CATALYTIC REDUCTION BY A NEUTRAL ALUMINIUM DOUBLE BOND

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CO₂ fixation and reduction to value added products is of utmost importance in the battle against rising CO₂ levels in the Earth's atmosphere. Herein we present the use of an organoaluminium complex containing a formal aluminium double bond (dialumene),¹ and thus an alkene equivalent, for the fixation and reduction of CO₂.² The CO₂ fixation complex undergoes further reactivity in either the absence or presence of additional CO₂, resulting in the first dialuminium carbonyl and carbonate complexes, respectively. Dialumene (**1**) can also be used in the catalytic reduction of CO₂, providing selective formation of a formic acid equivalent via the dialuminium carbonate complex rather than a traditional aluminium-hydride based cycle. Not only are the CO₂ reduction products of interest for C₁ added value products, but the novel organoaluminium complexes isolated represent a significant step forward in the isolation of reactive intermediates proposed in many industrially relevant catalytic processes.

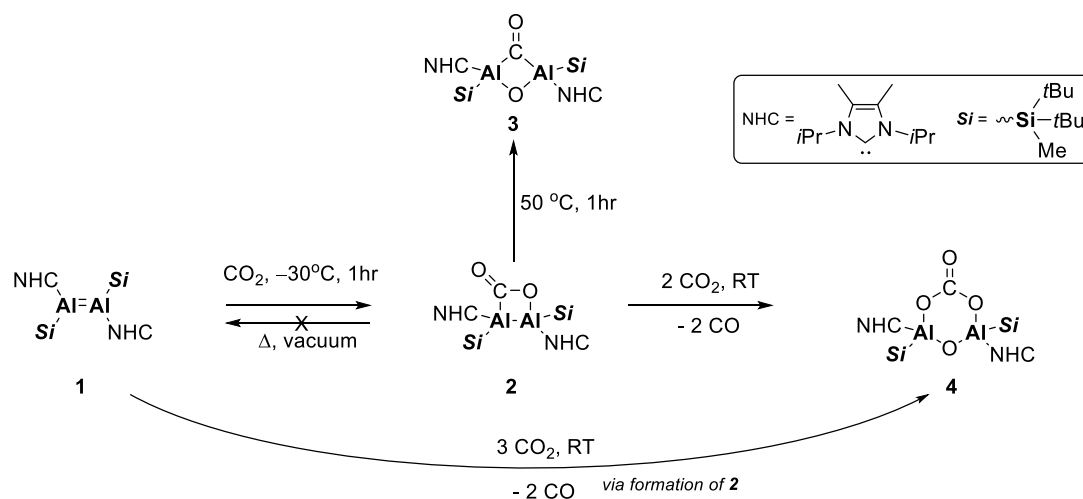


Figure 1. CO₂ fixation and stoichiometric reduction mediated by dialumene (**1**).

References

1. Bag, P.; Porzelt, A.; Altmann, P. J.; Inoue, S., *J. Am. Chem. Soc.* **2017**, *139* (41), 14384-14387.
2. Weetman, C.; Bag, P.; Szilvási, T.; Jandl, C.; Inoue, S., *Submitted*.