

DEHYDROCOUPLING OF SILANES WITH ALCOXYARENES AND AMINES CATALYZED BY RARE-EARTH METAL ALKYL COMPLEXES WITH N,N,O-HETEROSCORPIONATE LIGANDS

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Catalytic dehydrocoupling of hydrosilanes is an efficient and atom-economical method for obtaining silicon compounds as an alternative to traditional methods based on the use of chlorinated compounds¹. In this regard, the development of new stable catalysts based on alkyl complexes of lanthanoids for dehydrocoupling reaction of hydrosilanes with arenes and amines represents a relevant challenge.

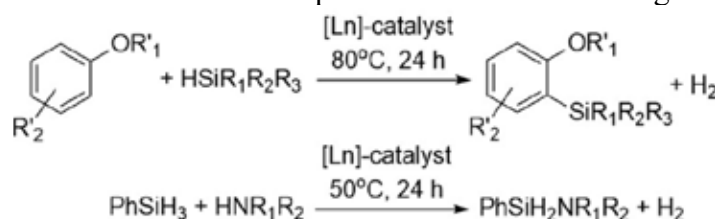


Figure 1. Dehydrocoupling reaction of hydrosilanes with arenes and amines

$\text{PzI}^{\text{Me}_2}_2\text{CP(=O)iPr}_2$ (PzI^{Me_2} – 3,5-dimethylpyrazole) was successfully used for the synthesis of bis(alkyl) complexes of yttrium, lutetium, and erbium.

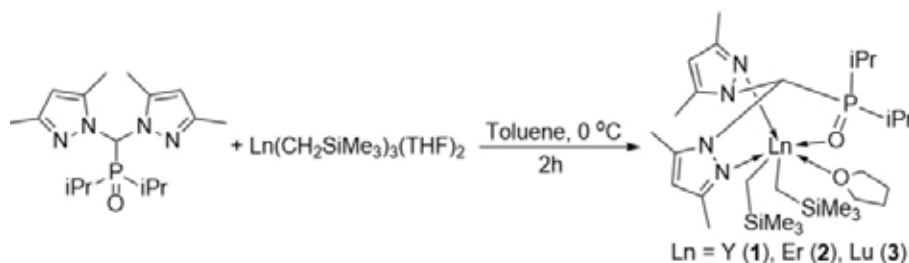


Figure 2. Synthesis of bis(alkyl) complexes of rare-earth elements

Cationic alkyl complexes, generated *in situ* by the reaction of equimolar amounts of compounds **1-3** with $[\text{Ph}_3\text{C}][\text{B}(\text{C}_6\text{F}_5)_4]$, have demonstrated significant catalytic activity in the dehydrocoupling of alkoxyarenes with various hydrosilanes (PhSiH_3 , Ph_2SiH_2 , PhMeSiH_2 , Ph_3SiH , Et_3SiH), selectively forming silylation products in the *ortho* position of the benzene ring. Additionally, complexes **1-3** have shown efficacy in the dehydrocoupling of PhSiH_3 with amines ($\text{C}_4\text{H}_9\text{NH}_2$, $\text{C}_6\text{H}_{11}\text{NH}_2$, $\text{C}_6\text{H}_5\text{NH}_2$, $\text{C}_6\text{H}_5\text{NHCH}_3$, $(\text{CH}_3)_2\text{CHNH}_2$), leading to the selective formation of silazanes.

References

1. C. Cheng, J. F. Hartwig, *Chem. Rev.* **2015**, *115*, 8946.

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