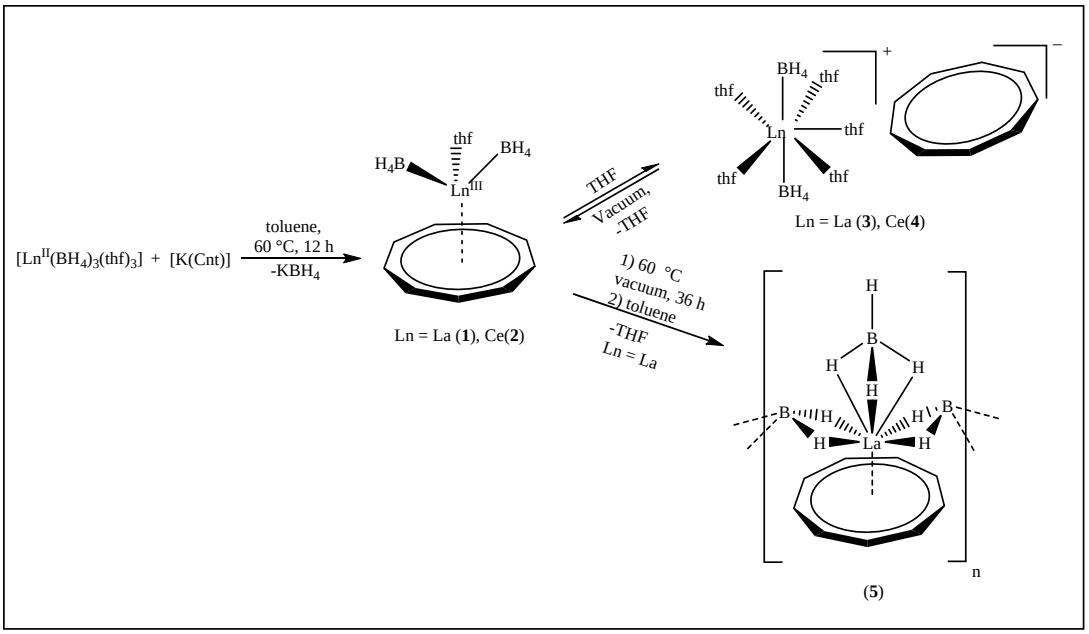
MONO-CYCLONONATETRAENYL LANTHANIDE COMPLEXES

Luca Münzfeld, Mohd. Iqbal, Adrian Hauser, Michael T. Gamer and Peter W. Roesky

Institute of Inorganic Chemistry, Karlsruhe Institute of Technology, Karlsruhe, Germany

Here, we have reported the synthesis of the first half-sandwich complexes utilizing the cyclononatetraenyl ligand (Cnt = C_9H) [1]. The title compounds were prepared by reacting $[Ln(BH_4)_3(thf)_3]$ with [K(Cnt)]. This reaction led to the formation of $[Ln^{III}(\eta^9\text{-Cnt})(\eta^3\text{-}BH_4)_2(thf)]$ [Ln = La (**1**) and Ce (**2**)] complexes. Subsequent treatment of complex (**1**) and (**2**) with tetrahydrofuran (THF) resulted in a reversible decoordination of the cyclononatetraenyl (Cnt) ring. This decoordination process led to the formation of ionic species $[Ln^{III}(\eta^3\text{-}BH_4)_2(thf)_5][Cnt]$ [Ln = La (**3**) and Ce (**4**). Moreover, when THF was removed from (**1**) and (**2**) it gave rise to the formation of a polymeric compound, $[La^{III}(\mu\text{-}\eta^2\text{:}\,\eta^2\text{-}BH_4)_2(\eta^3\text{-}BH_4)(\eta^9\text{-Cnt})]_n$ (**5**).

In summary, we have successfully synthesized the first half-sandwich complexes based on the cyclononatetraenyl ligand and explored their behavior under different conditions, leading to the formation of various ionic and polymeric species.



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[1] Münzfeld, L; Hauser, A; Gamer, M. T.; Roesky, P. W. Mono-cyclononatetraenyl lanthanide complexes. *Chem. Commun.* **2023**, *59*, 9070-9073.