


CenTRA

Centre des Terres Rares et Actinides

BOOK OF ABSTRACTS

CS²*f*E 

AUSSOIS, FRANCE

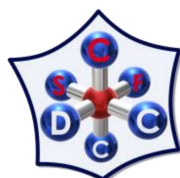
JUNE 12-16, 2022



Société Chimique de France



ANR-18-EURE-0012



FLi
France Life Imaging

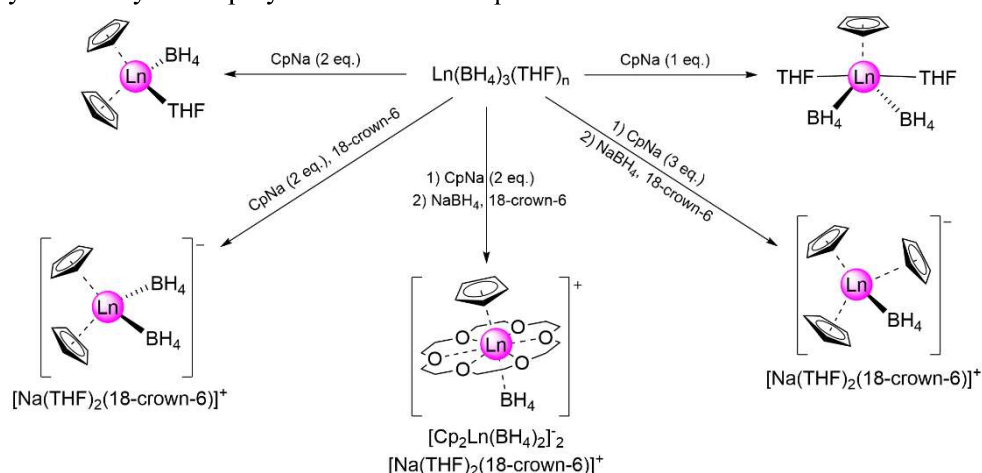
CYCLOPENTADIENYL LANTHANIDE BOROHYDRIDES DERIVED FROM THE UNSUBSTITUTED CYCLOPENTADIENYL LIGAND

D. Bardonov,^{1,2} G. Sadrtidnova,^{1,2} K. Lyssenko,¹ D. Roitershtein^{1,2}¹ A.V.Topchiev Institute of Petrochemical Synthesis, Russian Academy of Sciences, Moscow, Russia² HSE University, chemistry department, Moscow, Russia

Email address: daniil.bardonov@yandex.ru

Methods for the synthesis of lanthanide borohydrides $[\text{Ln}(\text{BH}_4)_3(\text{THF})_n]$ from lanthanide chlorides and alkali metal borohydrides have been known since the 1970s. As precursors for the synthesis of organometallic complexes of lanthanides, these compounds are preferable to the traditionally used halides because of the better solubility of borohydrides in organic solvents. Despite this, the number of structurally characterized organometallic complexes of lanthanides containing BH_4^- anion is extremely small.

Complexes with alkyl- and trimethylsilyl substituted cyclopentadienyl anions are the most studied of all organo-lanthanide compounds with the borohydride ligand, however cyclopentadienyl complexes with the anion of unsubstituted cyclopentadiene are practically unknown. In this work, our goal was to synthesize cyclopentadienyl-borohydride complexes of lanthanum, neodymium, gadolinium, terbium and lutetium containing the unsubstituted cyclopentadienyl anion, and to study their catalytic activity in the polymerization of ϵ -caprolactone.



In the course of the study, mono-, bis- and tris(cyclopentadienyl)borohydride complexes of lanthanides were obtained[1]. According to the XRD data, five structural types of complexes and complex ions were obtained for neodymium, two structural types, namely $[\text{CpNd}(\text{18-crown-6})(\text{BH}_4)]^-$ and $[\text{Cp}_3\text{Nd}(\text{BH}_4)]^-$, were discovered for the first time. It was shown that mono- and bis(cyclopentadienyl) neodymium complexes show high activity in the polymerization of ϵ -caprolactone, and the resulting polymers have a narrow molecular weight distribution ($\mathcal{D} = 1.17 \div 1.38$).

Acknowledgements.

The work was carried out within the framework of the Academic Fund Program at the National Research University Higher School of Economics (HSE) in 2021 (grant № 21-04-034).

References

[1] D. Bardonov, P. Komarov, G. Sadrtidnova, V. Besprozvannykh, K. Lyssenko, A. Gudovanny, I. Nifant'ev, M. Minyaev, D. Roitershtein, *Inorganica Chimica Acta* **2022**, 529, 120638