Synthesis and molecular structures of the magnesium and aluminum adducts of a niobium-oxo complex. X-ray crystal structures of [{$NbOCl_4(THF)$}$_2$$Mg(THF)_4$] and [{$NbOCl_4(THF)$}$_2$$AlCl(THF)_3$].

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Streszczenie

The most active Ziegler−Natta catalysts of alkene polymerization are d^0 metallocenes of the XIII, XIV, and XV groups. [1] On the other hand, vanadium catalysts [2] generally show a d^2 or d^3 configuration. However, d^0 vanadium complexes have frequently been used as catalysts but were readily reduced to a lower oxidation state in the presence of a cocatalyst. The synthesis of high polymers based on simple Nb(V) species as catalysts has also been reported. [3] It could be expected that V(V) and Nb(V) complexes would be effective catalysts if they could be stabilized in their high oxidation state. [4] In this contribution, we describe the synthesis and characterization of Mg^{2+} and Al^{3+} niobium−oxo adducts. The chemistry of transition metal−oxo M=O (V, Nb, Ta) adducts with electropositive metal ions such as Mg^{2+} or Al^{3+} as components of the catalyst is unknown yet. In a previous paper we described the synthesis and properties of products formed during reaction between $[MoOCl_3(THF)_2]$ and $[MgCl_2(THF)_2]$. [5] For a Mo/Mg 2:1 molar ratio in THF a crystalline salt $[Mg(THF)_6][MoOCl_4(THF)]_2$ is formed which reacts further with 3 equiv of bis(tetrahydrofuran)magnesium dichloride yielding the ionic $[Mg_2(\mu\text{-}Cl)_3(THF)_6][MoOCl_4(THF)]$ compound. The [{$MoOCl_4(THF)$}$_2$$Mg(THF)_4$] and $[MgMo(\mu\text{-}Cl)_3Cl_2O(THF)_3]$ molecular compounds were readily obtained by interaction of $[MoOCl_3(THF)_2]$ with $[MgCl_2(THF)_2]$ in a 2:1 and 1:1 molar ratio in CH_2Cl_2, respectively. However, compounds $[(ReMe_4O)_2Mg(THF)_4]$ and [{o-$C_6H_4(CH_2)_2WO$}$_2$$Mg(THF)_4$] arise from Grignard reagents or MgR_2 with R_2O_7 or WCl_4O in THF. [6,7]Similar adducts with Al^{3+} were unknown.

Słowa kluczowe

Adducts, Catalysts, Cations, Molecules, Tetrahydrofurans