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Vanadium (V) and titanium (IV) compounds with 2-[hydroxy(diaryl)methyl]-8-hydroxyquinolines: synthesis, structure and catalytic behaviors to olefin polymerization

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Abstract

A series of oxovanadium (V) and titanium (IV) complexes stabilized by $[\text{ONO}]^{2-}$ type ligands - 2-[hydroxy(diaryl)methyl]-8-hydroxyquinolines (**2-3**) were synthesized in high yields and characterized by elemental analysis, NMR-, IR spectroscopy and mass spectrometry. The molecular structures of the representative complexes **4** and **7** were confirmed by single-crystal X-ray diffraction, and revealed distorted octahedral geometry at Ti and tetragonal pyramid in V complex. Titanium-based catalytic systems were found to be active in the ethylene and 1-hexene polymerization and copolymerization, but only in the presence of a binary co-catalyst $\text{Et}_2\text{AlCl}/\text{Bu}_2\text{Mg}$. Vanadium-based systems were active in the same reactions in the presence of $\text{Et}_3\text{Al}_2\text{Cl}_3$ or Et_2AlCl mixed with $\text{CCl}_3\text{CO}_2\text{Et}$ reactivator. The amount of co-monomer incorporated by these systems have reached 23 mol %. When applied in the presence of aliphatic solvents vanadium complexes catalyze 1-hexene oligomerization yielding dimers and trimers. When the same process is carried out in toluene, the solvent got alkylated by monomers and light oligomers (Friedel–Crafts reaction).

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