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STRESZCZENIE PRACY DOKTORSKIEJ W JĘZYKU ANGIELSKIM

The aim of this doctoral thesis was to develop a highly active and selective supported vanadium catalyst system with an ionic liquid for (co)polymerization of ethylene with norbornene, allowing to control copolymer microstructure as well as to determine the correlation between the structure of ligand and the composition of catalytic system and the physicochemical properties of obtained (co)polymers.

In the first stage of the work, selected chloroaluminate ionic liquids differing in the type of cation were synthesized. Then, SIL catalyst systems with selected vanadium precursors and ionic liquids immobilized on modified silica supports, differing in particle size, surface area, and pore volume and size, were developed. In the next stage, the polymerization of ethylene was carried out with the participation of synthesized supported systems. The influence of composition of catalytic system and the reaction conditions on the polyreaction and the physicochemical properties of obtained polymers were checked. Subsequently, selected types of ligands and vanadium catalysts were synthesized. Next, (co)polymerization of ethylene with norbornene was investigated with the use of homogeneous vanadium catalysts differing in the structure of ligands. The influence of reaction parameters (activator / catalyst molar ratio, temperature, reaction time) on the efficiency of (co)polymerization and the physicochemical properties of obtained products was determined. Later, the copolymerization of ethylene and norbornene with the use of selected SIL systems was investigated. The influence of composition of catalytic system, reaction conditions, and initial concentration of norbornene on the copolymerization and physicochemical properties of the copolymer were checked, including the composition and distribution of the comonomer composition in copolymer macromolecules. The last step concerned a detailed characterization of structural and physicochemical properties of the obtained copolymers.

The innovative nature of this work is primarily related to the proposal to use vanadium catalysts with the participation of ionic liquid in (co)polymerization of ethylene with cyclic olefin - norbornene. The obtained results significantly broaden the knowledge on the preparation of copolymers with the designed structure and properties with the participation of new, not yet described, supported vanadium catalysts obtained with the participation of ionic liquid.