Bidentate Schiff Base Ruthenium Complexes as Precursors of Homogeneous and Immobilized Catalysts

Author(s)
Francis Verpoort
Baoyi Yu
Fatma Hamad
Heriberto Diaz Velazquez
Zhixiong Luo

Abstract
The paper presents an overview of the work conducted in our group on the synthesis of a novel class of homogeneous and immobilized Ru-complexes containing Schiff bases as O, N-bidentate ligands benefiting from a versatile, quite general and thoroughly exemplified two-step procedure. The new Ru-complexes with improved stability incorporate a variety of Schiff bases, associated with traditional inorganic and organic ligands such as chloride, phosphanes, arenes, cyclodienes, NHC etc., and different carbenes (alkylidene, vinylidene, allenylidene and indenylidene). By a proper choice of the Schiff base, useful physical and chemical properties of the derived Ru-complexes could be induced resulting in tunable catalytic activity for metathesis and related processes. A pertinent example is the latency of selected Schiff base Ru catalysts which by becoming active only under specific conditions (heat or acid activation) are ideal for industrial applications, e.g. reaction injection molding processes. The synthetic approaches that are critically discussed in this chapter have led to a diversity of Ru-complexes of which several members have risen to the rank of commercial catalysts.

Keywords
Isomerization,
Vinyl ester synthesis,
Atom transfer radical polymerization,
Kharash addition,
Cross metathesis,
Latent catalyst,
Ring opening metathesis,
Ring closing metathesis,
Olefin metathesis,
Heterogeneous catalysis,
Schiff base ligands,
Homogeneous catalysis,
Ruthenium hydrides,
Ruthenium arenes,
Ruthenium indenylidenes,
Ruthenium vinylidenes,
Ruthenium allenylidenes,
Ruthenium carbenes,
Organometallic chemistry,
Ruthenium