Perspectives of rhodium organometallic catalysis. Fundamental and applied aspects of hydroformylation.

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Streszczenie

Today's hydroformylation process almost exclusively use rhodium homogeneous catalysts. Some domination of octacarbonyl dicobalt as the catalyst precursor was followed with broad application of rhodium based organometallic catalysts modified with mainly phosphorus ligands of different donor–acceptor properties and/or different cone/bite angles. Although there are many papers dealing with the comparative studies on structure-reactivity correlation, the effects of electronic and steric parameters of P-ligands on the catalytic activity of rhodium catalysts are not always predictable. Phosphines and phosphites as ligands, simple and structurally developed, bulky, mono and bidentate are still of great interest in the modification procedures of rhodium catalysts, especially when high regioselectivity in the hydroformylation is expected. Further development of the synthesis of phosphorus ligands led to the preparation of water soluble ligands and the creation of a new class of two-phase homogeneous catalysts, in this way solving problems of separation and/or catalysts reuse. Some new water soluble phosphines (PNS, PNa, PC) as well as *N*-pyrrolyl phosphines ($PPh_x(NC_4H_4)_{3-x}$) of required electronic parameters applied for synthesis of new rhodium catalyst precursors will be discussed and the results of structural studies will be used in the explanation of the observed catalytic activity in the model hydroformylation reaction of olefins (1-hexene, unsaturated alcohols) as well as related reactions, i.e. isomerization and hydrogenation.

Słowa kluczowe

Hydroformylation, Phosphorus modifying ligands, Rhodium catalysts, Water soluble catalysts, Bimetallic catalytic systems