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Ruthenium complexes with a pyrazole-phosphine ligand

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Abstract: A new bifunctional pyrazole-based phosphine ligand was synthesized and applied to preparation of a series of ruthenium complexes. Application of the latter to transfer hydrogenation of acetophenone showed moderate activity. X-ray studies of two ruthenium complexes were carried out.

Keywords: phosphine • pyrazole • ruthenium • transfer hydrogenation • bifunctional catalysis

Introduction

Ruthenium complexes occupy a prominent position in catalytic transfer hydrogenation [1-12] which some time ago culminated in awarding a Nobel Prize in chemistry to R. Noyori [13, 14]. Phosphine, carbene, and arenes in combination with NH-amines (or amides) are the most common ligands in this chemistry, utilizing metal-ligand cooperativity to achieve increased activity [1, 15, 16]. Recently, Thiel et al. have introduced the use of pyrazole ligands which can possess bifunctional behavior as illustrated in Scheme 1 [17]. Yu's group achieved high TON and TOF for Ru catalysts supported by related pyrazole-based platforms [18-21]. Although the functioning of bifunctional catalysts may differ from the original Noyori suggestion [2, 7, 13],

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