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Synthesis and Characterization and Application of Zirconate(IV) Complex for C–C coupling reactions

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Carbon-Carbon bond forming reactions are among the important catalytic transformations in organic synthesis[1,2]. Heterogeneous catalysts have been highly investigated in the C-C cross coupling reactions [3]. The metal compelexs show high catalytic activities in various cross-coupling reactions of an aryl or alkenyl halide[4]. Highly efficient catalysts based on zirconium nanoparticles in C-C cross-coupling reaction were reported[5].

In this work, synthesis and characterization of the Zr(IV) complex, $[Ph_3PCH_2C_6H_4CH_2PPh_3]_2[ZrCl_6]$, has been reported. The prepared compound was characterized using elemental analysis and spectroscopic methods IR, ^1H, and ^{13}C NMR. Finally, this compound was investigated as an effective catalyst in Suzuki and Heck carbon-carbon coupling reactions. All products were prepared in the presence of this complex in high efficiency. The obtained compound can be recovered and it can be reused without significant reduction in its catalytic activity.

Keywords: Zirconium(IV) chloride, Suzuki reaction, Heck reaction

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