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Synthesis and Characterization of Novel Palladium(II) Schiff Base Complexes for the Deposition on SBA-15 in $scCO_2$ Media and Their Catalytic Activities for Suzuki- Miyaura Reaction

Asim Egitmen, Sinan Seven and Bilgehan Güzel

Çukurova University, Faculty of Science and Letters, 01330 Adana, Turkey

Homogeneous palladium complexes have been used widely in C-C coupling reactions. This type of catalysis showed high yield and selectivity. Due to poor separability and recyclability, heterogeneous catalyst has been developed. Different solid materials such as; MW-CNT, Silica, Alumina, activated carbon, SBA-15 have been used as support material [1-2]. In this study, Schiff base ligands were synthesized by condensation of 2-fluoro-3-trifluoromethyl aniline with 2-hydroxy- 4-methyl benzaldehyde. Its palladium complex was synthesized and characterized by elemental analysis, FT-IR and 1H NMR. Elemental analysis data is matched with theoretical data. In FT-IR (KBr, pellet, cm^{-1}) spectra of ligand specific peaks observed at O-H 3417 cm^{-1} , C-H(Ar) 3050 cm^{-1} , C=N 1625 cm^{-1} , C=C 1569 cm^{-1} , C-F 1170 cm^{-1} . Disappearances of O-H peak at FT-IR spectrum of Pd complex indicated that the formation of metal complexes and azomethine group shifted to the lower wavenumbers, 1606 cm^{-1} in all the complexes suggesting the coordination of the azomethine nitrogen to the metal centers. This is further substantiated by the presence of a new band around 446 cm^{-1} . In the 1H NMR (300MHz, DMSO/ppm) spectrum of ligand; δ 2.34 (s, 3H, CH_3), δ 6.83-7.82 ppm (m, 1H, C=C-H), δ 9.02 ppm (s, 1H, H-C=N), δ 12.54 ppm (s, 1H, O-H). In the 1H NMR spectra of palladium complex, O-H peak disappeared due to complexation and δ 1.037 (s, CH_3) ppm, δ 6.39-7.62 (m, C=C-H), δ 8.207 ppm (s, H-C=N). The synthesized Palladium complex used as precursor for $scCO_2$ deposition method and characterized by XRD, TEM and SEM. According to the XRD data, palladium nanoparticles were adsorbed onto the MW-CNT with a size range of 3- 5 nm. The XRD pattern of palladium nanoparticles is given in figure 1. The resulting Pd nanoparticles used as catalyst for Suzuki coupling reaction over phenyl boronic acid and bromobenzene.

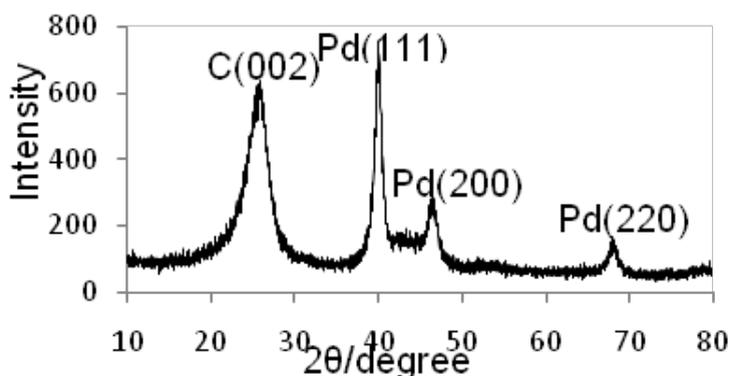


Figure 1. XRD pattern of Pd nanoparticles

Biography:

Asim Egitmen is a PhD student at chemistry department in Cukurova University. He received his master degree in 2012 from inorganic chemistry of Cukurova University. His Research interests nanomaterials, heterogeneous catalyst and C-C coupling reactions.

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