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*Proceeding Paper*

# The Novel Chitosan-Based Pd Catalytic Systems for the Heck Cross-Coupling Reaction †

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**Abstract:** In this survey, novel Pd catalysts supported on Chitosan and EDTA were prepared for the first time and their structures were appropriately demonstrated by various analytical and identification techniques including FT-IR, EDX, XRD, SEM, TEM, TGA, DRS and BET. The Catalysts were successfully employed in the Heck Cross-Coupling Reactions (HCR) with good to excellent yields. Different aryl halides carrying Br, Iodine and Cl halogen substituents, were used in the HCR with different acrylates to synthesis cinnamic acid and its valuable ester derivatives. The catalysts show a variety of advantages such as excellent thermal stability, easy recovery by simple filtration, more than five cycles of reusability with no significant decrease in their efficacy, biodegradability, biocompatibility and brilliant result in the HCR with low loaded Pd on the substrate.

**Keywords:**

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## Introduction

Due to importance of chitosan, as natural and biodegradable material, in the synthesis of biocatalyst and its application in recent years for the synthesis of organic compounds trough famous organic reactions such as Heck, Suzuki and Sonogashira Cross-Coupling reactions [1–6]. multicomponent reactions (MCR), and also according to previous published articles in our research laboratory [3,7–14], we have designed a novel biocompatible and economic catalytic system. In this survey, we do our best for the introduction of various amino acids and chitosan on the both sides of EDTA dianhydrid respectively followed by decorating $PdCl_2$ on the substrate to employ in the HCR for the synthesis of cinnamic acid and its ester derivatives with high to excellent yields.

## Materials and Methods

Chitosan, 100 mesh, active alkenes, proper base, solvents, amino acids and other reagents were provide from the Merck Co. and the results were checked by different instruments including FT-IR and NMR spectroscopies and other techniques such as TGA, EDS, XRD, FESEM and BET.

## Experimental Section

To synthesis of desired products, aryl halides, alkenes, base and very small amount of catalysts were reacted together in the proper solvent under reflux conditions. One of the products was methyl cinnamate. The IR spectrum of the EDTA dianhydride, mentioned product, Chitosan and one of the catalysts were illustrated in (Figures 1–4).

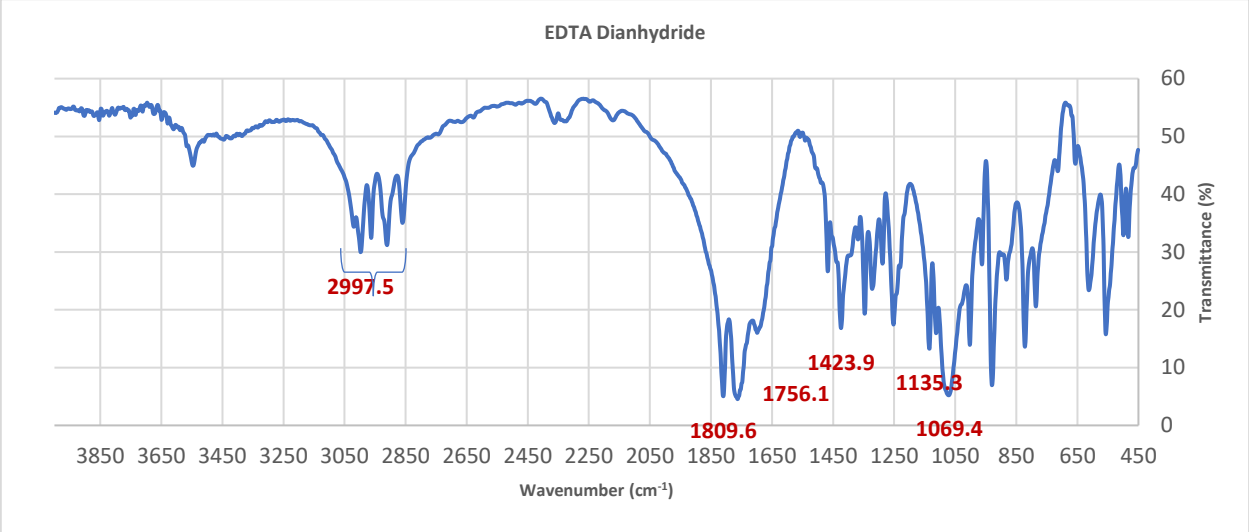


**Figure 1.** The IR spectrum of EDTA dianhydride.

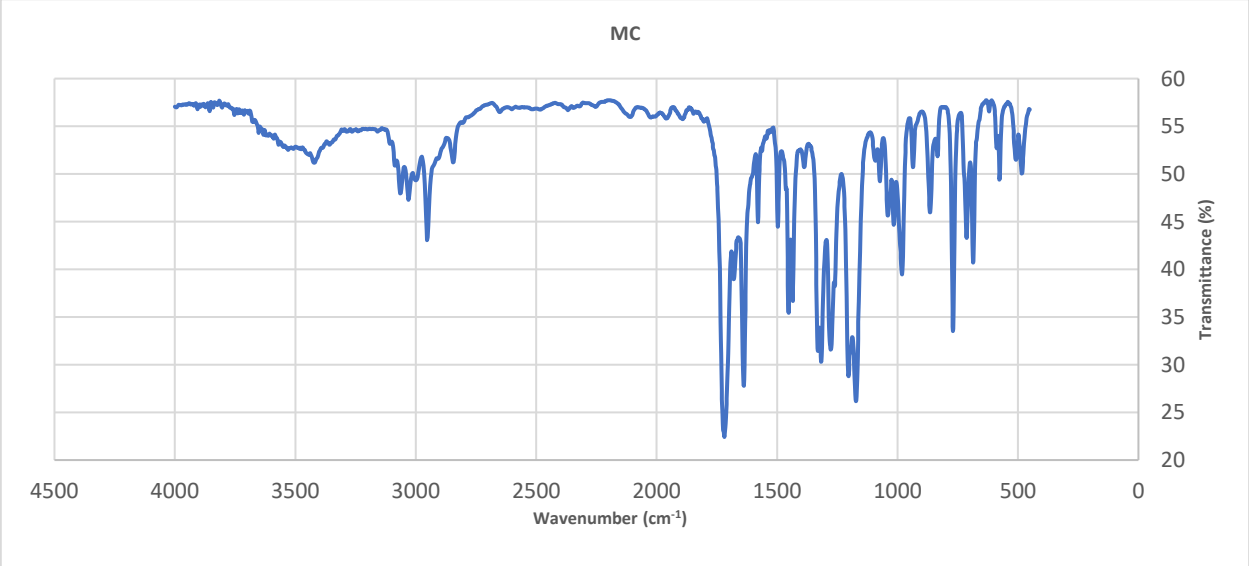


**Figure 2.** The IR spectrum of methyl cinnamate.

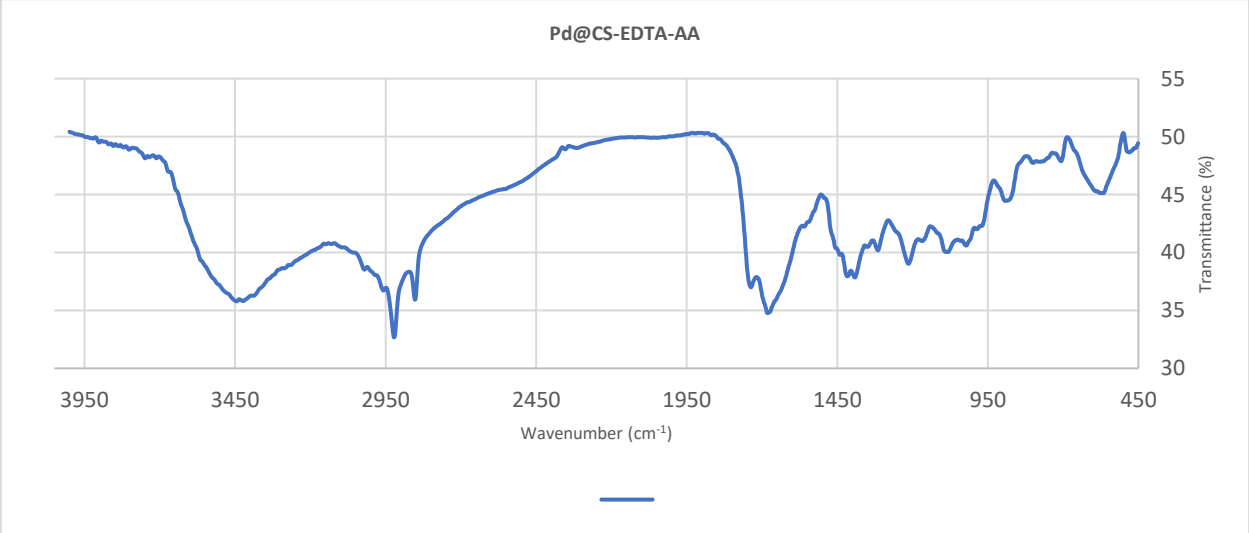


**Figure 3.** The IR spectrum of catalyst 1.

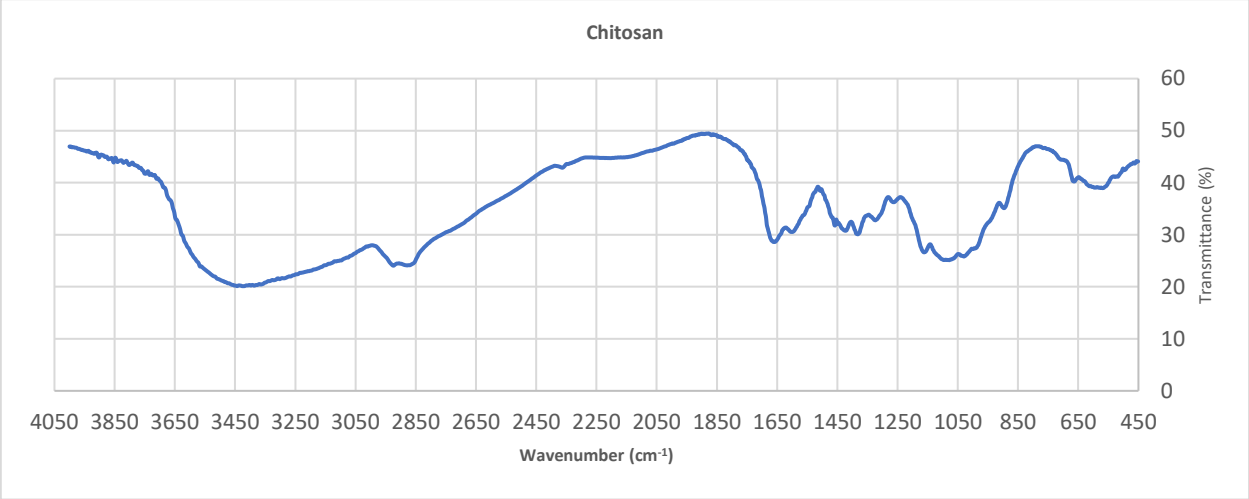


**Figure 4.** The IR spectrum of chitosan. .

The final version of this paper will published very soon.

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