UNIVERSITI TEKNOLOGI MARA

NICKEL (II) ACETATE IN HECK COUPLING

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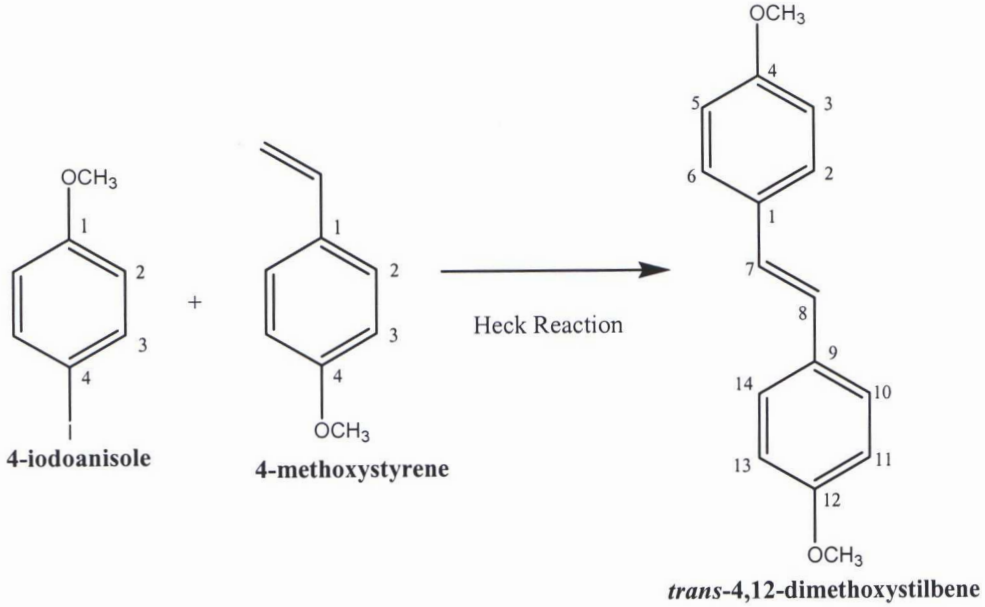
TABLE OF CONTENTS

ABSTRACT

This research aims at investigating the effectiveness of nickel (II) acetate as a catalyst in the Heck reaction. Eight different conditions have been utilized in order to accomplish this research study. Each of these conditions was applied to synthesize the same stilbene. The commercially available 4-iodoanisole and 4-methoxystyrene were coupled together under the Heck reaction by using these conditions in attempt to synthesize 4,12-dimethoxystilbene. As the result, utilizing nickel (II) acetate as a catalyst in the presence of tetraphenylphosphonium chloride as a ligand able to produce 1.07% yield only, while in the presence of tri-*p*-tolylphosphine, tri-*o*-tolylphosphine as a ligand, and cesium carbonate as a base was not able to produce any yield respectively. By utilizing palladium chloride as a catalyst in the presence of the same conditions, the desired stilbene able to be produced with the yield of 40% (with tetraphenylphosphonium chloride), 20.05% (with tri-*p*-tolylphosphine), 4.11% (with tri-*o*-tolylphosphine), and 5% (with cesium carbonate). TLC, ^{1}H NMR and FT-IR characterization were used to confirm the desired product.



4-iodoanisole **4-methoxystyrene** ***trans*-4,12-dimethoxystilbene**

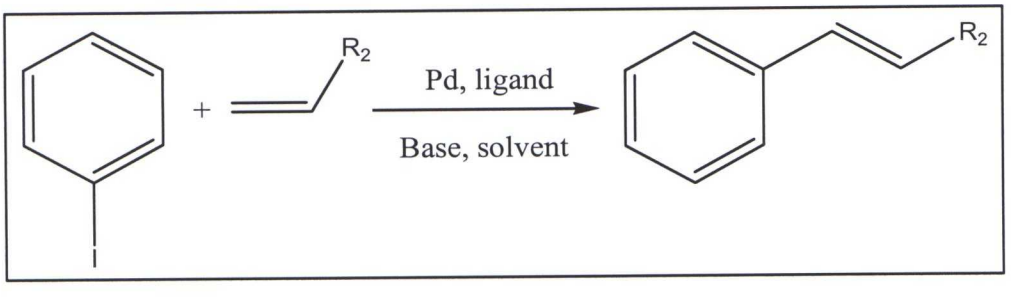
CHAPTER 1

INTRODUCTION

1.1 Stilbenes

Stilbenes (1,2-diphenylethene) derivatives were claimed to have many potential therapeutic values and beneficial to human. Resveratrol is one of the naturally occuring stilbene analogues which was effective to reduce cardiovascular diseases, and also have anti-oxidative, anti-mutagenic, antifungal, cytotoxic, anti-inflammatory, antivirus, and antibacterial activities (Ferre-Filmon, K. *et al.*, 2004).

Because of these therapeutic values, stilbenes have become a compound of interest among researchers to be investigated and to be synthesized. Some methods have been developed to synthesize stilbenoids. Heck reaction was one of the reliable methods in synthesizing stilbenes by coupling aryl halide with aryl alkene (styrene) under the appropriate conditions (Ferre-Filmon, K. *et al.*, 2004).



Scheme 1.1: Stilbene is synthesized by coupling aromatic halide with aryl alkene under the appropriate conditions.