



5<sup>th</sup> NATIONAL  
**INORGANIC  
CHEMISTRY  
CONGRESS**  
ABSTRACT BOOK  
APRIL 22-25, 2015

V. ULUSAL  
**ANORGANİK  
KİMYA  
KONGRESİ**  
ÖZET KİTABI  
22-25 NİSAN 2015

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P-059

## Synthesis, Characterization of New Type Salen Pd(II) Compounds and Investigation of Catalytic Activity in Heck Cross-Coupling Reactions

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Salicylethylenediamine derivatives (salen) and their complexes with transition metals have significant catalytic activity in several transformation reactions of organic molecules [1,2]. In this study, two new salen type ligands N,N'-Bis(4-(diethylamine)salicylaldehyde)-1,2-phenylenediamine (L1) and N,N'-Bis(3-tert-butyl-2-hydroxybenzaldehyde)-1,2-phenylenediamine (L2) and their Pd(II) complexes were synthesized. Structures of ligands and the complexes have been characterized by FT-IR, <sup>1</sup>H-NMR and <sup>13</sup>C-NMR techniques. The resulting catalytic activity of the compounds L1Pd and L2Pd was investigated on Heck C-C coupling reactions between bromobenzene and styrene by using different solvents (dimethylformamide, 1,4-dioxane, toluene, dimethylacetamide) and different bases (treated with K<sub>3</sub>PO<sub>4</sub>, K<sub>2</sub>CO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>, Et<sub>3</sub>N) at various temperatures (30, 60, 90, 120, 140°C). (Substrate/Catalyst ratio: 500) [3]. Optimal reaction conditions according to the test results; Na<sub>2</sub>CO<sub>3</sub> was selected as the base and dimethylacetamide (DMA) as the solvent at a temperature of 140°C. In the next step, the catalytic activity of the complexes was determined by using different aryl bromides (bromobenzene, 2-bromo-6-methoxynaphthalene, 2-bromoacetophenone, 1-bromonaphthalene, 4-bromoacetophenone, 4-bromotoluene, 2-bromobenzaldehyde, 4-bromobenzaldehyde, m-bromonitrobenzene, 1-bromo-3-chlorobenzene, 2-bromoanisole, 4-bromoanisole) and styrene derivatives (Table.1).

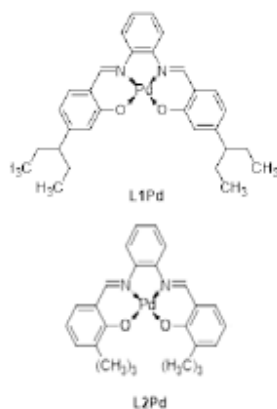


Table 1. Heck coupling reaction between aryl bromides and styrene derivatives, the implementation results<sup>a</sup>

No	Aryl bromide	Styrene derivatives	% Conversion	
			L1Pd	L2Pd
1	Bromobenzene	2-methyl styrene	14.4	34.8
2	2-bromoacetophenone	2-methyl styrene	99.8	79.3
3	4-bromotoluene	2-methyl styrene	13.7	29.7
4	4-bromotoluene	3-methoxystyrene	88.8	88.1
5	4-bromobenzaldehyde	2-methyl styrene	99.9	98.8
6	2-bromobenzaldehyde	2-methyl styrene	99.8	82.7
7	m-bromonitrobenzene	3-methoxystyrene	55.7	58.3
8	m-bromonitrobenzene	2-methyl styrene	99.9	68.5
9	4-bromoanisole	3-methoxystyrene	79.8	46.5
10	2-bromo-6-methoxynaphthalene	2-methyl styrene	85.1	83.7

<sup>a</sup>The reaction conditions: Aryl bromide (1.0 mmol), olefin (1.2 mmol), Na<sub>2</sub>CO<sub>3</sub> (1.2 mmol), catalyst (0.002 mmol), DMA (2 mL), temperature (140 °C) (Conversions were determined by GC according to the aryl bromide.)

**Keywords:** Pd(II)-Salen, Heck C-C coupling reactions, Catalyst, Arylbromide, Styrene

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