



ISSN Print: 2394-7500  
 ISSN Online: 2394-5869  
 Impact Factor: 5.2  
 IJAR 2015; 1(12): 1017-1018  
 www.allresearchjournal.com  
 Received: 07-09-2015  
 Accepted: 09-10-2015

**Neha Babbar**  
 D.A.V College, Abohar

## Electrophilic Substitution Reaction Using $ZnCl_2$ Catalyst/ $SiCl_4$ - $NaNO_3$

**Neha Babbar**

### Abstract

Development of new Silane reagent derive from  $SiCl_4$  was applied in the presence of  $NaNO_3$  and  $ZnCl_2$  (Homogeneous nitrating system). The nitration proceeds smoothly under mild conditions in good yield. Above reagent consider to be of economic advantage and environment friendly. Above reaction can be used for synthesis of potential drug.

**Keywords:** Nitration, Sodium Nitrate, Tetrachlorosilane

### Introduction

Nitrated aryl compounds remained in dispensable over the last two centuries due to their industrial and commercial applications. They are used as plastics, explosives, agro chemicals, dyes, pigments and polymers. These compounds can be synthesized from aryl precursors employing various nitrating agents like nitric acid, metallic nitrates, nitronium salts and acetyl nitrates. But there are major drawbacks in using reagents. These are acidic corrosivity of the nitrating agents, poor regioselectivity and environmental pollutions. As nitrations are usually associated with heat, which may cause secondary reactions or decomposition of final product which leads to low purity and yield. Nitrate salts can be used but the reagent is not cheap. These are difficult to prepare, store and handle.

### Method:

First it was used for the nitration of phenol. To a stirred solution of phenol in Dichloromethane (10 ml),  $NaNO_3$  was added. TCS and  $ZnCl_2$  were then added and the reaction mixture stirred at room temperature in the dark for about 40 minutes. After completion of the reactions, water was added and the reaction mixture was extracted with dichloromethane and dried over  $Na_2SO_4$ . The solvent is distilled off and resulting crude product can be separated by steam distillation. It can be successfully applied for the preparation of p-Iodonitrobenzene from Acetanilide.

4-Nitrophenol

Yield-55%, Yellow colored solid.

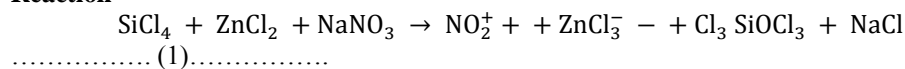
4-Nitrotoluene

Yield-65%, Yellow colored solid.

4- Iodonitrobenzene

Yield-70%, Black colored solid.

### Reaction



Aromatic compound + 1  $\rightarrow$  Nitrated Aromatic compound

**Correspondence**  
**Neha Babbar**  
 D.A.V College, Abohar

**Table 1:** Effect of solvents in the nitration of phenol with NaNO<sub>3</sub>/TCS

Entry	Solvent	Conversion of time (min.)	Substrates molar ratios Phenol: NaNO <sub>3</sub> :SiCl <sub>4</sub> <sup>a</sup>	Products(s)	Yield%
1	Ethanol	0	1:1:1	b	-
2	Ethanol	0	1:2:2	b	-
3	Chloroform	260	1:2:2	o-Nitro phenol p-Nitro phenol	40 60
4	Dichloromethane	30	1:1:1:5	o-Nitro phenol p-Nitro phenol	30 70
5	Dichloromethane	30	1:1:2	o-Nitro phenol p-Notro phenol	40 60

- a. No reaction was observed in the absence of TCS;  
 b. The reaction was exothermic, low yielding.

### References

1. Ono N. The Nitro Group in Organic Synthesis. Wiley, Hoboken, 2001.
2. Olah AG, Malhotra R, Narang CS. Nitration. Methods and Mechanisms. VCH, New York, Weinheim, 1989.
3. Hoggett JG, Moodie RB, Penton JR, Schofield K. Nitration and Aromatic Reactivity. Cambridge University Press, 1971.