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HIGHLY EFFICIENT CATALYTIC BROMINATION OF NAPHTHALENE

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Bromination of hydrocarbons is an important process because it leads to useful intermediates for the synthesis of a large variety of bromoorganic compounds. These materials have numerous industrial application as pesticides, plastics, fire retardants, and pharmaceutical chemicals. Also it used to prepare organic glass-forming materials find varied application in modern science and technology. Organic polymers with high glass transition temperatures are used as dielectric insulating layers in microelectronic devices. Amorphous organic materials play an important role as electroluminescent materials in optoelectronic device applications. Considerable attention is focused on amorphous (glassy) formulations of pharmaceuticals.

Zeolites with straight channels less than a nanometre across are widely used as 'molecular sieves' to separate molecules of different sizes and shapes. Zeolites are considered to be much more environmentally friendly than other traditional catalysts.

The present research investigates the development of a bromination system for naphthalene to produce 1,4-DBN and other derivatives in high yield with stirring process only by using liquid bromine in the presence of a solvent over zeolite and Synclyst as catalysts. 1,4-DBN has become increasingly important as a triplet excitation acceptor with useful phosphorescent properties. It is also useful as a precursor for other 1,4-disubstituted naphthalene derivatives. However, in spite of the potential importance of

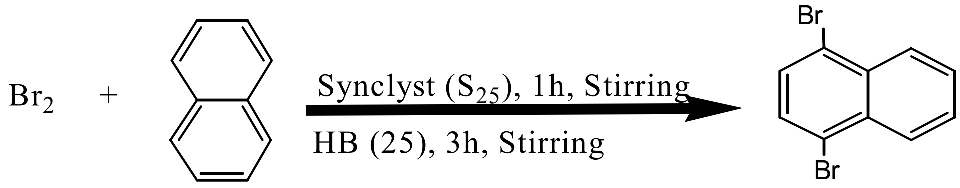
1,4-DBN, existing methods for its preparation are not very practical. In consequence, only a very limited range of commercial

1,4-disubstituted naphthalene is available, and they are generally very expensive. Therefore we have sought a better synthesis of 1,4-DBN.

Identification of the reaction product

Fig 1. Bromination of naphthalene include:

Br2–HY zeolite and Br2–alumina/Silica (Synclyst)



1,4-DBN

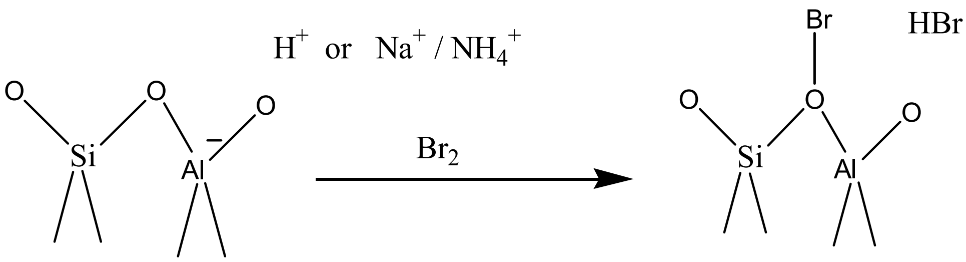


Table 1 the results by using zeolite and synclyst.[a]

Zeolite/ Synclyst (SiO_2/Al_2O_3)	**Time**	**Yield (%)**
HY(25)	3h	> 96
Synclyst (S25)	1h	> 92

[a] Reactions were carried out with zeolite and synclyst which were calcined at 550°C at least 6h, naphthalene (0.979 g, 0.84 mmol), ***bromine*** **(0.48 ml 0.93 mmol) and dichloromethane (50 ml) were stirred only.**

Our interest in utilizing acidic catalysts as zeolites, Synclyst, Silica, and clays for achieving selectivity, high yield, and catalysis in organic reactions prompted us to investigate bromination of naphthalene in clay microenvironment.

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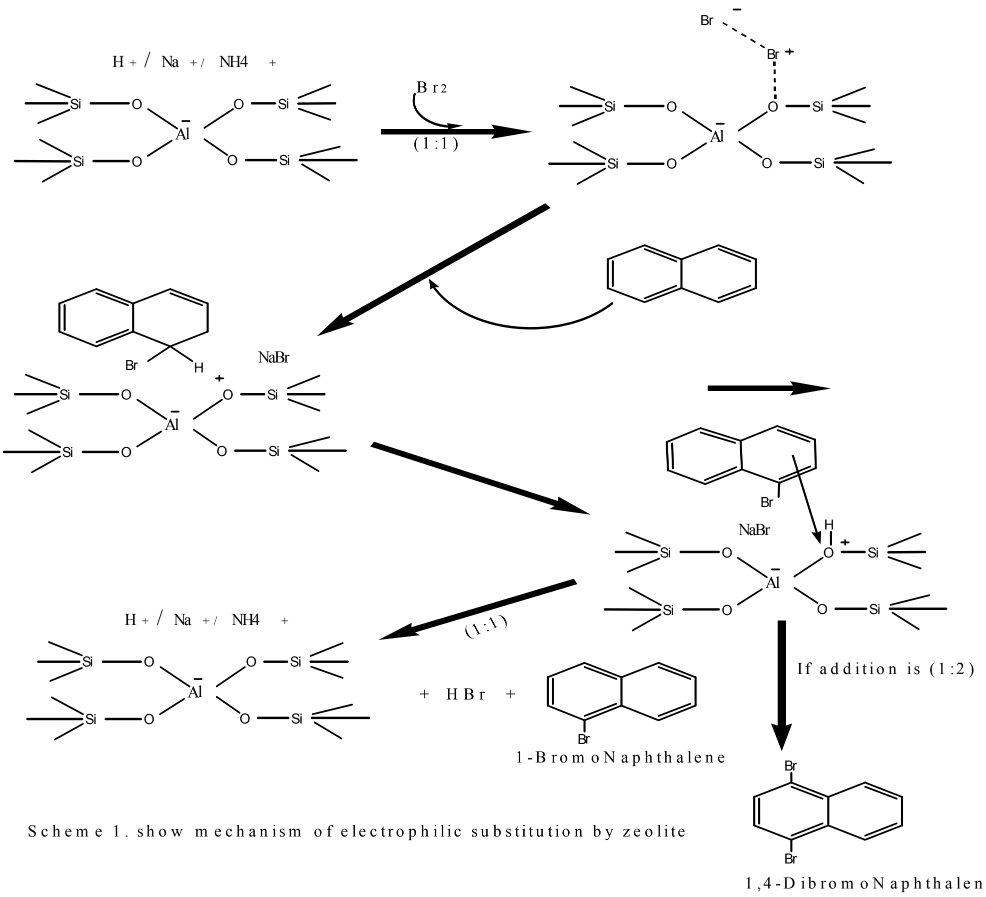

Scheme 1. show mechanism of electrophilic substitution by zeolite

Conclusion

Around more than 96% yield of *1,4-DBN* was obtained using zeolite Hβ (25) and Synclyst (25) in dichloromethane with stirring process only at room temperature. Further attempts will be made to push the reaction to completion to produce more disubstituted naphthalene derivatives (dibromonaphthalene) with high yield and also increase the regioselictivity of the reaction environmentally.

Acknowledgement

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