## The Identification of an Unknown Substituted Benzene Using Friedel-Crafts Acylation and its Analysis by IR and H-NMR Spectroscopies

#### Introduction

The Friedel-Crafts acylation is a reaction between an aromatic ring and a carbonyl, or acyl, group with the required addition of a catalyst, AlCl<sub>3</sub> in this case, as shown in Scheme 1. This reaction is known as an electrophilic aromatic substitution (EAS). In this experiment, a Friedel-Crafts acylation will be performed using acetyl chloride on an unknown substituted benzene (C<sub>8</sub>H<sub>10</sub>O). The product, or unknown, will be analyzed and identified using its IR and H-NMR spectra. The overall reaction is shown in Scheme 1 below:

Scheme 1

Friedel-Crafts acylation involves the reaction of an acyl chloride, like acetyl chloride, with an aromatic compound in the presence of a Lewis acid catalyst, typically aluminum chloride (AlCl3). This forms an acylium ion, which reacts with the aromatic compound through nucleophilic substitution, resulting in the formation of an aromatic ketone. The mechanism

Scheme 2

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