

S_N2 Reaction of an Alkyl Halide and an Aniline

CHEM HELP *ASAP*

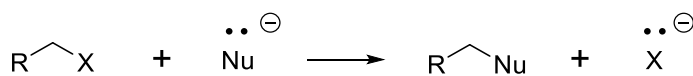
experiment video: <https://youtu.be/dFO2gI3Z1hQ>

Purpose

The purpose of this experiment is to demonstrate an S_N2 reaction between an alkyl halide (2-bromoacetophenone) and an aniline (*para*-toluidine).

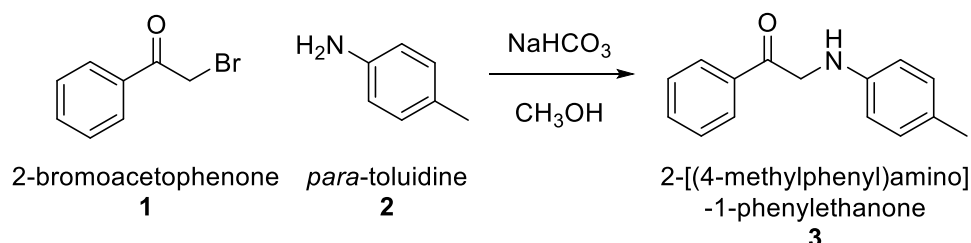
Background

S_N2 reactions involve the attack of a strong nucleophile (often an anion) on the carbon of an alkyl halide. The nucleophile displaces the leaving group to break the carbon-halogen bond and form a new carbon-nucleophile bond. The reaction occurs in one step. If the starting halide is attached to a chiral carbon, then the stereochemical configuration is inverted during the reaction.



Scheme 1. Model S_N2 reaction.

The S_N2 reaction can be demonstrated on 2-bromoacetophenone (**1**) and *para*-toluidine (**2**) (Scheme 2). The reaction forms 2-[(4-methylphenyl)amino]-1-phenylethanone (**3**) after the included base, sodium bicarbonate, neutralizes the initial S_N2 product.



Scheme 2. Today's reaction – an S_N2 reaction

Procedure – 2-[(4-methylphenyl)amino]-1-ethanone

In a 20 mL scintillation vial dissolve 2-bromoacetophenone (5.0 mmol) in 10 mL methanol with stirring. Add *p*-toluidine *trans*-stilbene (5.0 mmol) followed by sodium bicarbonate (6.0 mmol). All the reaction to stir in a shallow warm water bath. The temperature of the bath should not cause the reaction to boil. After 1 h check the reaction by TLC (30% EtOAc/70% hexane) to confirm consumption of either the halide or aniline. Cool the reaction mixture in an ice water bath. Filter the mixture with a Buchner funnel and a 125-mL side-arm flask. Be sure to seat the filter paper with methanol, not water. Rinse the filter cake with a minimal amount of cold methanol. Allow the isolated product to air dry, determine the product's mass, calculate a percent yield, record the melting range, and perform a TLC analysis of the product. Dispose of your TLC mobile phase in a waste container. Interpret the provided NMR spectrum. Record all your observations in your notebook.