Experiment No. 4

**Nucleophilic substitution reaction between 4-nitrophenol and**

**propargyl bromide**

**Aim:** Nucleophilic substitution reaction between 4-nitrophenol and propargyl bromide

**Chemical:** 4-Nitrophenol, propargyl bromide, potassium carbonate, sodium thiosulfate, DMF

**Apparatus:** 100 mL round bottom flask, glass stopper, stir bar, hot plate, 250 mL round   
 bottom flask, 250 mL conical flask, separating funnel, funnel, glass column,   
 and test tubes.

**General procedure:**

To a room temperature solution of 4-Nitrophenol (7.18 mmol) in DMF (15 mL), K2CO3 (14.5 mmol) and 3-bromo-1-propyne (8.50 mmol) were added. After monitoring the reaction by TLC (2 h), the reaction mixture was poured into a separating funnel with H2O (50 mL) and extracted with Et2O. The organic phase was washed with sodium thiosulfate solution (30 mL) and then with brine (30 mL), dried, filtered and concentrated under vacuum. The residue was purified by column chromatography on silica gel.



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**Result**: The product obtained was:

1.

2.

3.

4.

5.

Yield (%):

Melting point:

IR:

TLC:

Questions:

1. Write three examples of nucleophilic substitution reaction (with reaction mechanism).

2. What will be the difference in chemical shift in 1H NMR of methylene protons of starting   
 material 2 and the product 3 in above reaction?