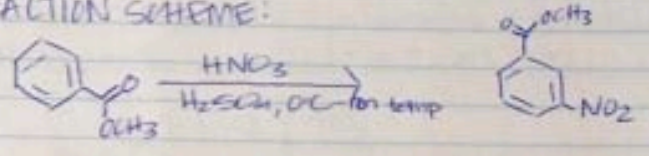
NITRATION OF METHYL BENZOATE

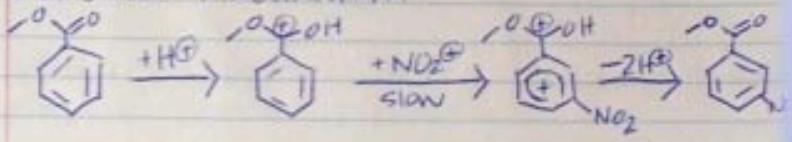
REFERENCE: Williamson, *Macroscale & Microscale Organic Experiments*, pp (432-433)

PARTNER: Alisha

REACTION SCHEME:



REACTION MECHANISM:



PROCEDURE	OBSERVATIONS
① Add 1.0mL sulfuric acid in 10x100mm rxn tube, add 0.200g methyl benz.	
② shake or stir tube and put in ice bath	- turned pink & smelled like pepto bismol
③ use 10x100 tube #2, add .2mL nitric acid	- temperature rose rapidly & dropped quickly after.
④ add mixture slowly while keeping on ice bath	
⑤ warm tube to room temp and allow to react 10-15min.	
⑥ add 2.5g ice & mixture to a small beaker	- looks like feta cheese
⑦ separate solid using hirsch funnel & vacuum, wash with water	

PROCEDURE	OBSERVATIONS
⑤ dry product as much as you can, weigh & calculate % yield, & melting point.	+ looks like off-white, dried up play-doh + weight 0.0955g + m.p. 65.8°C

RESULTS

MW methyl Benzoate: 136.16g/mol
MW methyl-3-nitrobenzoate: 181.15g

Starting weight: 0.300g methyl benzoate
product weight: 0.0955g

$$0.0955g \times \frac{1\ mol}{181.15g} = 0.00053\ mol$$

$$0.300g \times \frac{1\ mol}{136.15g} = 0.0022\ mol$$

$$\frac{0.00053\ mol}{0.0022\ mol} \times 100\% = \boxed{25.04\%\ yield}$$

melting point: 65.5°C

DISCUSSION

Through nitration of methyl benzoate we expected to recover approximately 80% of our compound in the form of methyl 3-nitrobenzoate. We also expected to observe a melting point of approximately 78°C in the final compound.

We recovered less product than expected, and observed a lower melting point than expected.

Our low yield may be explained by our failure to add a sufficient amount of reacting acid before the mixture was allowed to react for 10 minutes. ~~Our lower~~ The difference in melting point may be ~~desc~~ explained by a not fully dried product.