YIELD AND PERCENTAGE YIELD

Yield • the mass of a product obtained in reaction

Percentage Yield • the mass of product obtained expressed as a percentage of what you ought to get assuming complete conversion

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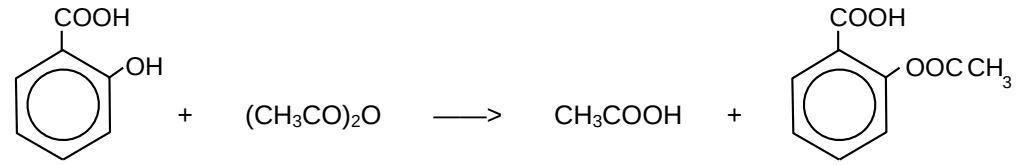
Calculation 1 What mass of salicylic acid is needed to make 5g of aspirin (assuming 100% conversion)?

Aspirin can be made in the laboratory by the reaction between salicylic acid (2-hydroxybenzoic acid) and ethanoic anhydride. If one mole of each of the reactants is used the masses involved are...



$M_r = 138$ $M_r = 102$ $M_r = 60$ $M_r = 180$

In order to make 180g of aspirin you will need a minimum of 138g of salicylic acid.

If you only want 5g of aspirin you will need to scale the masses accordingly...

molar scale	138g	102g	60g	180g
divide by 180	138g/180	102g/180	60g/180	1g
multiply by 5	5 x 138g/180	5 x 102g/180	5 x 60g/180	5g

3.833g salicylic acid ——————————> 5g of aspirin

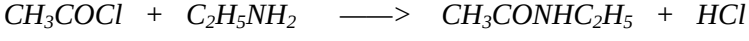
Calculation 2 When an experiment was carried out using 3.833g of salicylic acid, only 3.75g of aspirin was produced. What is the percentage yield of aspirin?

If the reaction gives a 100% yield then 3.833g salicylic acid ——> 5g of aspirin

If only 3.75g of aspirin is produced, the percentage yield = 3.75g / 5g x 100 = 75%

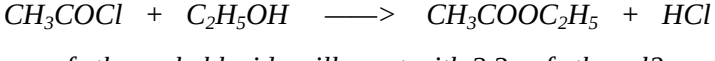
QUESTIONS

1. *The equation for the synthesis of N-ethyl ethanamide from ethylamine and ethanoyl chloride is...*



- *What mass of ethanoyl chloride is required to make 3g of N-ethyl ethanamide?*
- *If only 1.8g are produced, what is the percentage yield?*

2. *Ethyl ethanoate can be synthesised from ethanoyl chloride and ethanol.*



- *What mass of ethanoyl chloride will react with 2.3g of ethanol?*
- *If only 1g of ethyl ethanoate is produced, what is the percentage yield from 2.3g of ethanol?*