4-Acetamido benzoic acid

Chemicals

- Magnesium sulfate -heptahydrate
- Potassium permanganate
- 4-Acetamidotoluene
- Hydrochloric acid, w(HCl)=20%
- Ethyl alcohol solution σ(Ethanol)=35%
- Activated carbon

Material
Material

- 500 mL-multiple neck flask
- Stirring motor
- Stirrer with locking
- Cooler with cooling tubes
- Thermometer with joint
- Beaker glasses
- Dropping funnel
- Cooling bath
- Heating unit
- Measuring cylinder
- Erlenmeyer flask
- Round bottom flask
- Funnel with folded filter
- Powder funnel (??)
- Suction filter with rubber cuff
- Feeding bottle
- Vacuum connection
- Spatula
- pH-Paper
- Porcelain stick, porcelain bowl
- Cabinet dryer
- Precision balance

Safety tips

Potassium permanganate •H272 H302 H410 •P210 P280 P273 P301+P312 •HAZARD!! 	Hydrochloric acid •H314 H335 •P280 P301+P330+P331 P305+P351+P338 P309+P310 •HAZARD!! 
Ethyl alcohol: •H225 •P210 P243 P280 •ATTENTION!! 	

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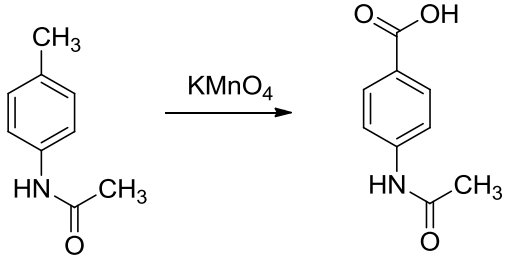
Reaction equation

Oxidation of the methyl group at the aromatic hydrocarbon with potassium permanganate



Experimental procedure

- Prepare 10 g of magnesium sulfate-heptahydrate, 14,9 g of 4-Acetamidotoluene and 300 mL of water in a 500 mL-multiple neck flask apparatus with stirrer
- Whilst stirring add carefully 50 g Potassium permanganate
- Heat up to 50°C whilst **stirring strongly**
- After that let the temperature (exothermal reaction) rise to 80°C (Attention: foaming is possible)
- Cool with cooling bath to hold the temperature between 75°C-80°C
- After the exothermal reaction stirr for another 15 minutes and hold the mixture at 90-95°C (below the boiling limit)
- Evacuate the generated manganese ore (MnO_2) which is then washed four times with every 30 ml of water
- Combine the washing water with the first filtrate
- Pour the complete filtrate in a beaker glass with stirring apparatus
- Whilst stirring cool the filtrate quickly down to 20°C, then add 100 ml of water. Then add hydrochloric acid w(HCl)=20% until pH=2 is reached
- Stirr the received suspension for 25 minutes at 20°C, then evacuate and wash the filter cake two times with water
- Recrystallize the still moist raw product using activated carbon from 250 ml ethyly alcohol solution, σ(Ethanol)=35%
- Cool the filtrate quickly to 20°C, evacuate the product und wash the filter cake one time with 30 ml of water
- Dry the product to mass consistency at 120-130°C

Waste disposal:

- Dispose of the evacuated manganese dioxide in the container for solid material
- Dispose of the filtrated mixture of ethyl alcohol and water in the container for halogen free solvents

Evaluation

- Calculate the yield of product related to 4-Acetamiditoluene in grams and percentage of theory

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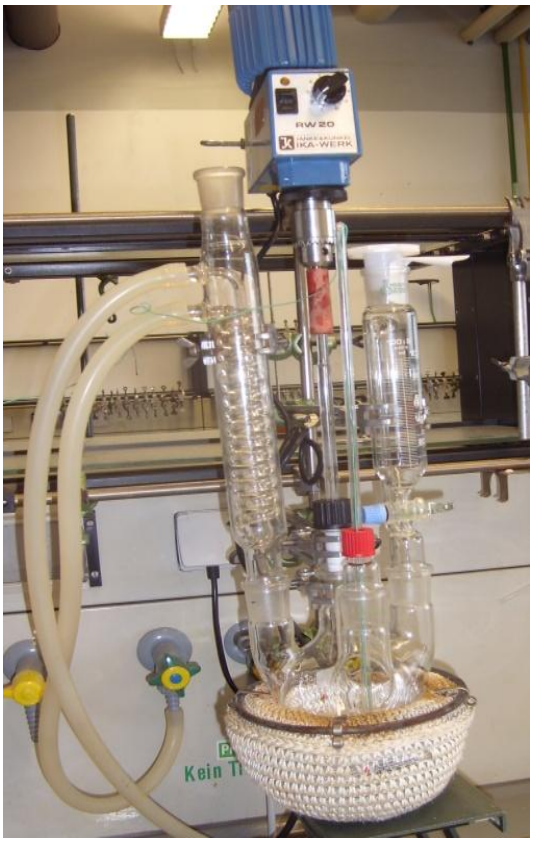
Preparation list

Chemicals:

•Magnesium sulfate-heptahydrate	10 g
•Potassium permanganate	50 g
•4-Acetamidotoluene	14,9 g
•Hydrochloric acid, w(HCl)=20%	30 mL
•Ethyl alcohol solution σ(Ethyl alcohol)=35%	250 mL
•Activated carbon	



Tools:

- 500 ml multiple neck flask
- Stirring motor
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- Suction filter with rubber cuff
- Suction flask
- Vacuum connection
- Spatula
- pH-Paper
- Porcelain stick, porcelain bowl
- Drying oven
- Precision balance

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