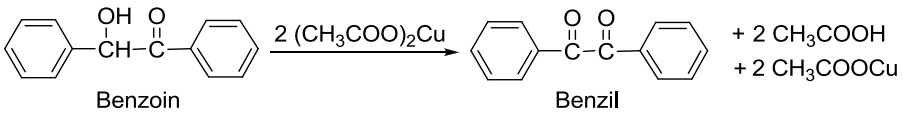
SYNTHESIS OF BENZIL

Reaction Equation:



Required Items:

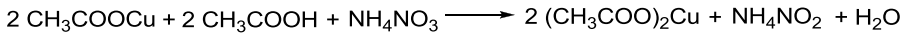
Copper-II-acetate
Ammonium nitrate
80% acetic acid
Benzoin
Alcohol

Experimental Procedure:

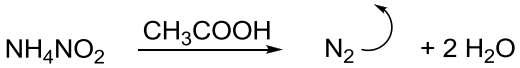
- 25 mg of copper-II-acetate, 1.25 g of ammonium nitrate, 8.25 ml of 80% acetic acid solution and 2.5 g of benzoin are mixed in 250 ml of flask.
- The mixture is heated under reflux and on a water bath for one hour.
- During heating, the flask is stirred by shaking.
- At the end of the period the mixture is cooled by vigorous shaking.
- The residue is filtered and dried on filter paper.

Reaction Progress:

The solution of benzoin in concentrated nitric acid or acetic acid is generated benzil, which is a diketone by oxidation with catalytic amounts of copper-II salts which are continuously reformed with ammonium nitrate. The resulting copper-I-acetate is converted to copper-II-acetate in acetic acid with ammonium nitrate:



Meanwhile, the ammonium nitrite leaves the reaction medium by forming nitrogen and water in the acetic acid medium:



M.P. and Yield of Product: 95 ^{o}C, 72%

Questions

1. Why is copper-II-acetate used in the oxidation process? Can nitric oxide be used? Why?
2. How to prepare 80% of acetic acid? Show your calculation. ($D_{Acetic\ acid}$=1,05 g/mol)