

Safe Working Procedure for the Preparation of Jones' Reagent

Jones reagent has been widely used in organic chemistry for oxidation, although its use has declined. As the reagent has a reputation for causing fire and as chromium is highly toxic, alternative, safer oxidising agents should be considered before Jones' reagent is used.

Preparation

1. Add sulphuric acid (H_2SO_4) slowly to equivalent amount of chromium trioxide (CrO_3) ; Cool the mixture in an ice bath at all times.
2. Add $\text{H}_2\text{SO}_4 + \text{CrO}_3$ suspension very slowly to cooled distilled water. The amount of distilled water to be used will depend on the concentration required in the subsequent reaction.

Note: Jones' reagent is a mixture of CrO_3 and dilute H_2SO_4 . Concentrated acid can be used for the preparation of mixture followed by dilution or previously prepared dilute acid can be used to make the mixture.

3. Transfer the Jones' reagent into a clean glass bottle, free of any organic solvents. Seal and label the mixture and stored in a cool and dark location.
4. Add water to the dirty glassware and cool the aqueous mixture in an ice-bath. Add alcohol (example isopropyl alcohol (IPA)) in excess quantity slowly to quench the residual Jones' reagent in the aqueous mixture. (Note: the reaction is highly exothermic. Reagent and product are flammable) This is to convert the excess Cr(VI) to Cr(III). The reaction is complete when the solution turns green (due to formation of Cr (III)).

Precaution:

- Cr(VI) is highly toxic and must be treated before disposal
- The reaction between Jones' reagent and IPA is highly exothermic. IPA is to be in excess and reagents cooled in an ice-bath.
- Use fume cupboard for the preparation of the reagent and the quenching of excess Jones Reagent. Precautions of fume cupboard use shall be followed.

The following personal protective equipments (PPE) are to be used:

Safety glasses, Labcoat, Latex gloves, Long pants, Covered shoes
Jones' reagent must always be used in a well ventilated fume cupboard

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