

# JONES OXIDATION

--Reported by Jones and co-workers

- In 1946, E.R.H. Jones and co-workers successfully converted alkynyl carbinols with chromic acid ( $\text{CrO}_3$  mixed with dilute sulfuric acid) to the corresponding alkynyl ketones without oxidizing the sensitive triple bond.
- The reaction was carried out in acetone by slowly adding the aqueous chromic acid to the substrate at ambient temperature, and the product was isolated in high yield.

# The general features of the reaction are:

1) the chromic acid ( $\text{H}_2\text{CrO}_4$ ) can be prepared by dissolving chromic trioxide ( $\text{CrO}_3$ ) or a dichromate salt ( $\text{Cr}_2\text{O}_7$ ) in acetic acid or in dilute sulfuric acid

Jones试剂的制备:

在500mL烧杯中用水(75mL)溶解三氧化铬(25g, 0.25 mol)、在冰浴下, 慢慢滴加浓硫酸(25mL)并且一边搅拌。溶液的温度保持在 $0\sim 5^\circ\text{C}$ 。  
制备的试剂溶度应该是2.5M

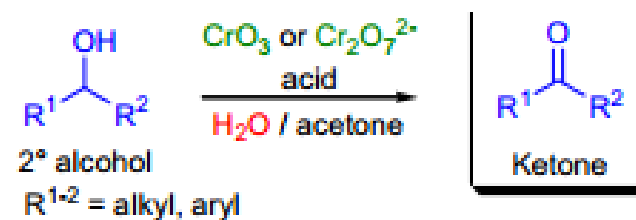
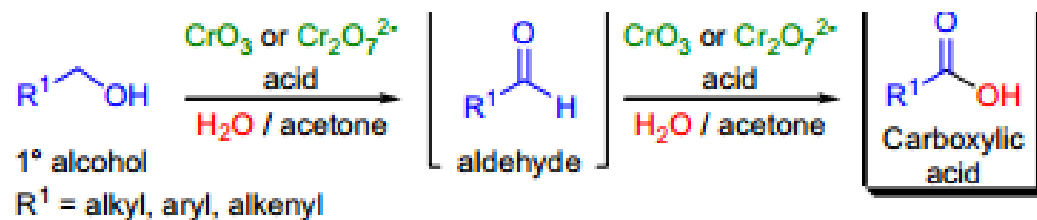
2) the oxidation is usually carried out in acetone, which serves a dual purpose: it dissolves most organic substrates, and it reacts with any excess oxidant so it protects the product from overoxidation;

3) allylic and benzylic alcohols are efficiently oxidized to the corresponding aldehydes with little or no over-oxidation

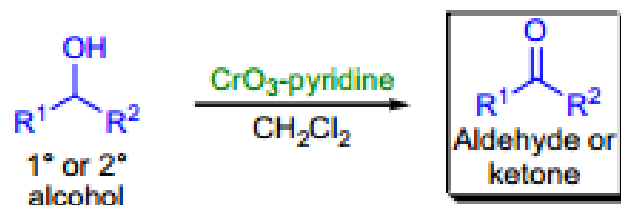
- 4) glycols and acyloins often suffer C-C bond cleavage under the reaction conditions, but in certain cases the addition of  $Mn^{2+}$  or  $Ce^{3+}$  salts prevents this side reaction
- 5) isolated double and triple bonds remain unchanged, but  $\alpha,\beta$ -unsaturated aldehyde products may undergo double bond isomerization;

6) acid sensitive protecting groups are easily removed under the reaction conditions; and free amines are often incompatible with the Jones oxidation, and they need to be protected as the corresponding perchlorate salts prior to the oxidation.

For particularly acid sensitive or otherwise delicate substrates the use of the strongly acidic Jones reagent is clearly not the best method of oxidation, so several mildly acidic  $\text{CrO}_3$ -derived oxidizing agents were developed



Sarett and Collins oxidations (1953 & 1968):



PCC and PDC oxidations (Corey, 1975 & 1979):

