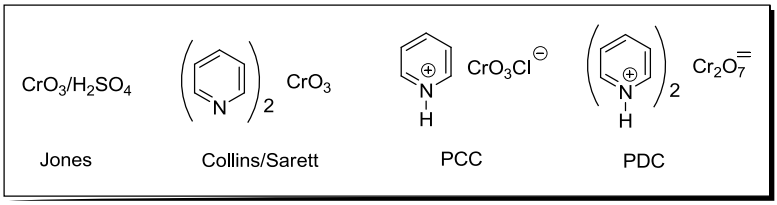
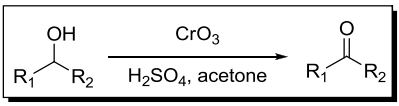
## Jones oxidation

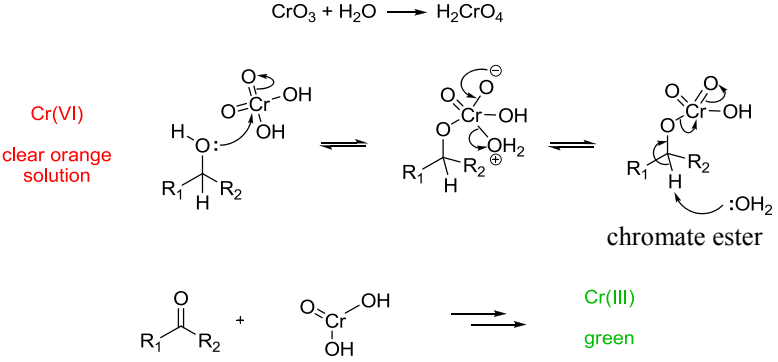
The **Collins/Sarett oxidation** (chromium trioxide-pyridine complex), and **Corey´s PCC** (pyridinium chlorochromate) and **PDC** (pyridinium dichromate) **oxidations** follow a similar pathway as the **Jones oxidation** (chromium trioxide and sulfuric acid in acetone). All these oxidants have a chromium (VI), normally orange or yellow, which is reduced to Cr(III), often green.



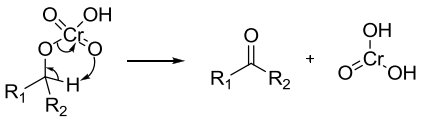

### *Jones oxidation*

By the Jones oxidation, the primary alcohols are oxidized to the corresponding aldehyde or carboxylic acids, whereas the secondary alcohols are oxidized to the corresponding ketones.



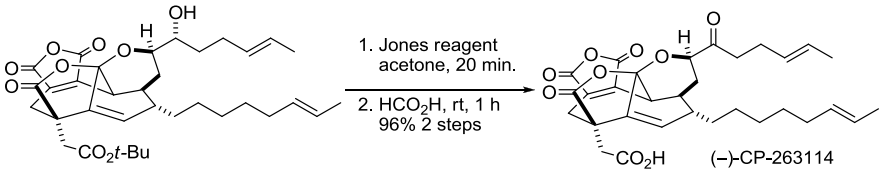




The intramolecular mechanism is also operative:

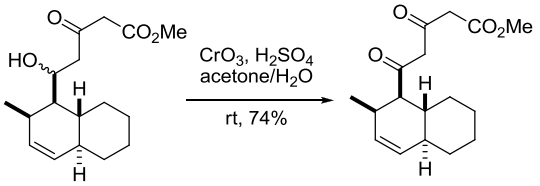


J.J. Li, *Name Reactions: A Collection of Detailed Mechanisms and Synthetic Applications*,
DOI 10.1007/978-3-319-03979-4_143, © Springer International Publishing Switzerland 2014

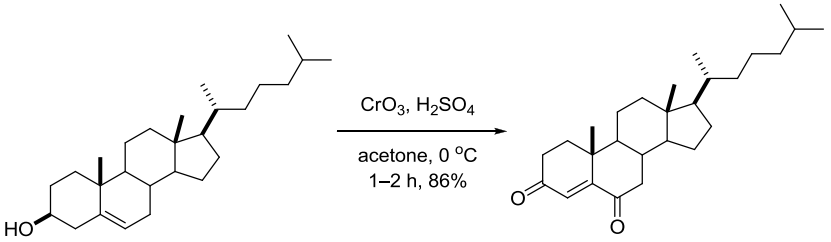
Example 1[6]




Example 2[7]




Example 3[9]

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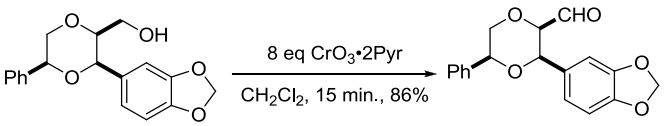
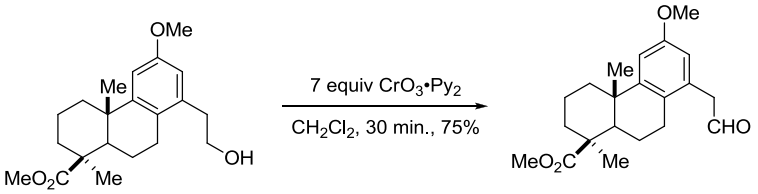
## *Collins oxidation*

Different from the Jones oxidation, the Collins oxidation, also known as the Collins–Sarett oxidation, converts primary alcohols to the corresponding aldehydes. $CrO_3$•2Pyr is known as the ***Collins reagent***.

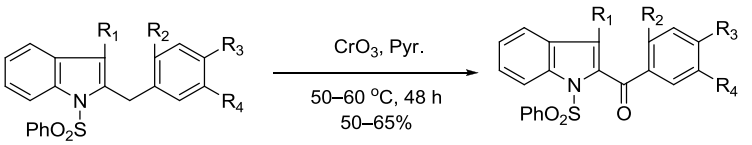
Example 1[5]




Example 2[7]




Example 3[9]

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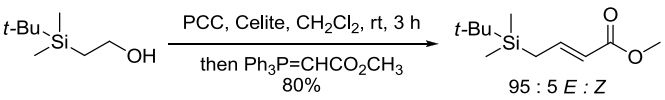
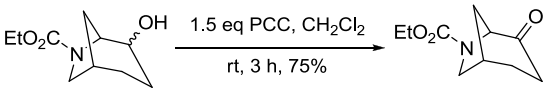
## *PCC oxidation*

Alcohols are oxidized by pyridinium chlorochromate (PCC) to the corresponding aldehydes or ketones. They are not further oxidized to the corresponding carboxylic acids because the reaction was done in organic solvents, not in water. If water existed, the carbonyls would form *aldehyde hydrates* or *ketone hydrates*, which are then oxidized to acids.

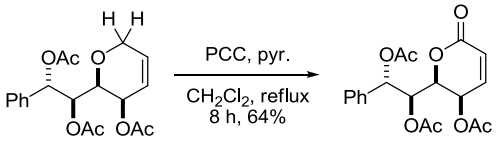
Example 1, One-pot PCC–Wittig reactions[2]



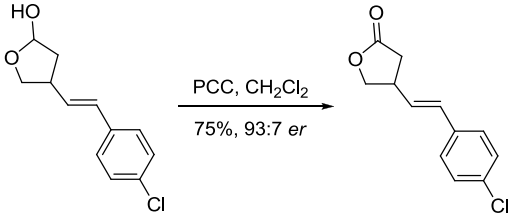

Example 2[3]




Example 3, Allylic oxidation[4]




Example 4, Hemiacetol oxidation[5]

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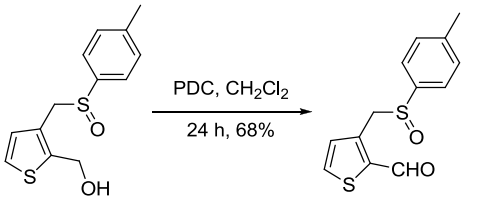
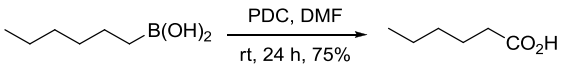
## *PDC oxidation*

Pyridinium dichromate (PDC) may oxidize alcohols all the way to the corresponding carboxylic acids instead of aldehydes and ketones as PCC does.

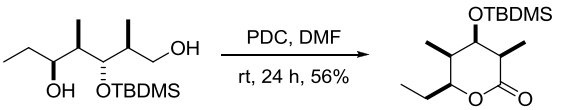
Example 1[2]



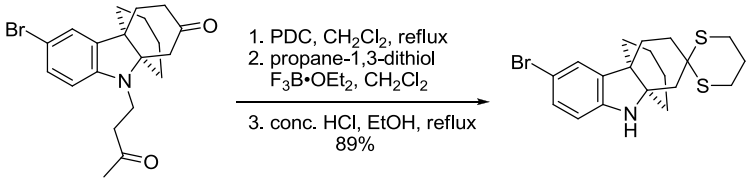

Example 2, Cleavage of primary carbon–boron bond[3]




Example 3, Hemiacetal as an intermediate[5]




Example 4[2]

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