

## Chapter 4. Petrochemicals from propylene.

. Propylene :  $\text{CH}_3\text{CH}=\text{CH}_2$

- Propylene is always a byproduct.

2/3 : a byproduct of refinery process  
1/3 : steam cracking of ethane and naphtha for ethylene production.

. Propylene                      ethylene                      1/2

. Propylene                      :

(1) Polypropylene - 29%

(2) Acrylonitrile - 15%

(3) Propylene oxide - 13%

(4) Isopropanol - 11%

(5) Cumene - 9%

(6) Butyraldehyde - 8%

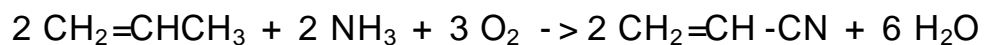
(7) Acrylic acid - 2%

(8) Others - 13%

Total. 100%

(1) Acrylonitrile

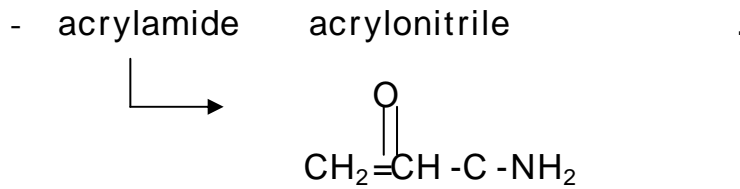
- Produced by the direct ammoxidation, oxidative amination of propylene.



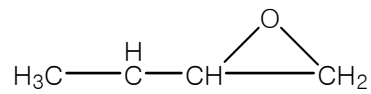
( ) Plastics and resins

polyacrylamide( )

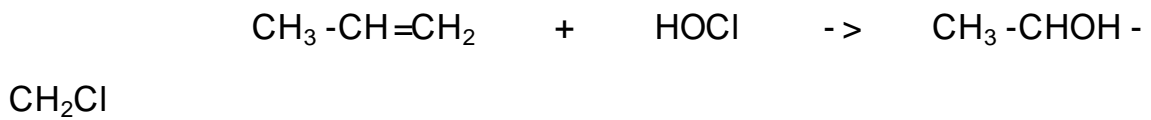
acrylamide .



(2) Propylene oxide

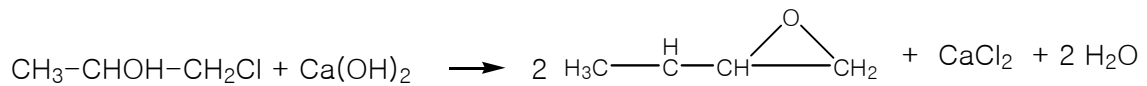


( ) Propylene chlorohydrin process

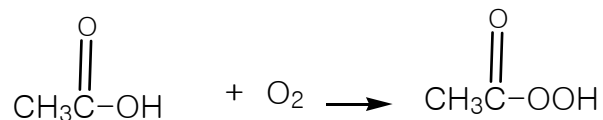
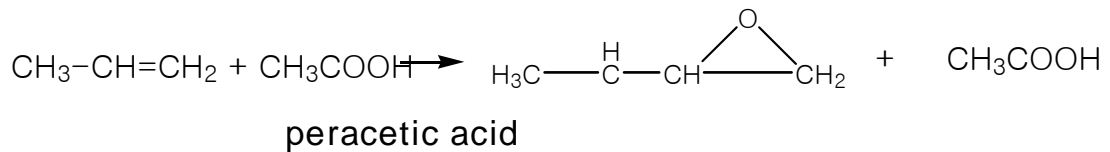


hypochlorous  
acid

propylene  
chlorohydrin



( ) Epoxidation by peroxides



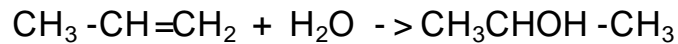
( )

flexible foam      rigid foam

propylene glycol, poly (propylene glycol)

(3) Isopropanol :  $\text{CH}_3\underset{\text{OH}}{\text{CH}}-\text{CH}_3$  (2-propanol)

( ) Direct hydration

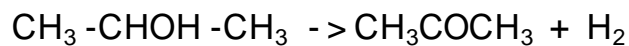


( ) sulfation -hydrolysis process

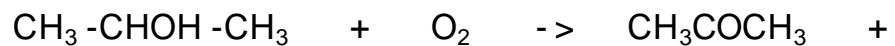
( ) acetone ( )

. Acetone :  $\text{CH}_3\text{COCH}_3$

Dehydrogenation of isopropanol

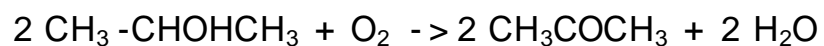


Direct oxidation

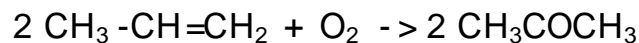


$\text{H}_2\text{O}_2$

Oxidation -dehydration process



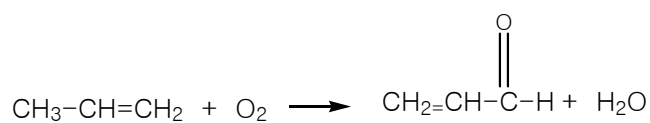
Directly from propylene

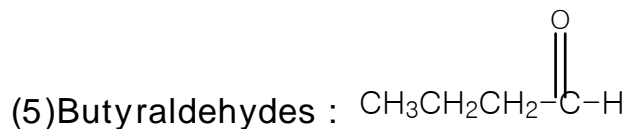
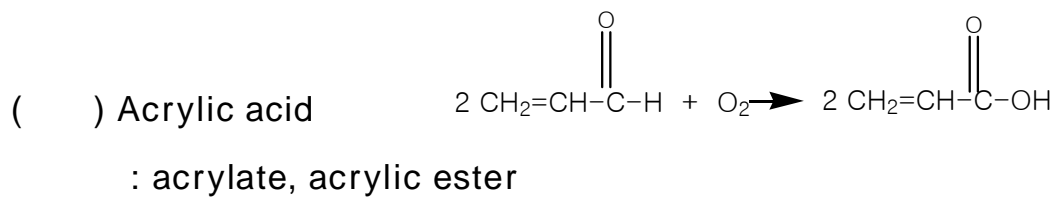


( ) (solvent) .

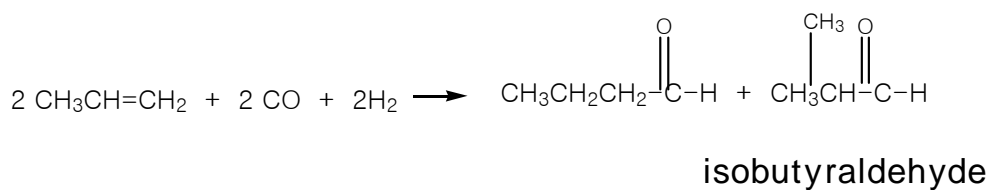
(4) Acrolein :  $\text{CH}_2=\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{H}$

- produced by the catalytic oxidation of propylene.



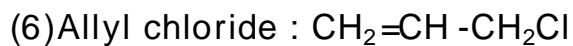
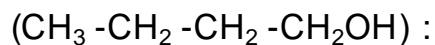


- Produced by the catalytic hydroformylation of propylene.

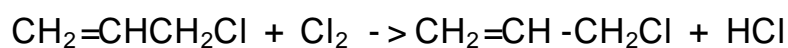


( )

n-butanol



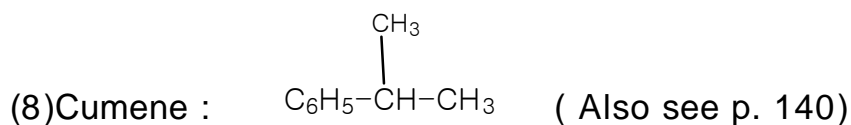
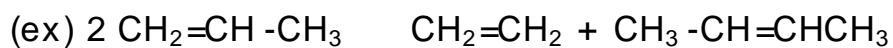
- Produced by the high temp. chlorination of propylene.

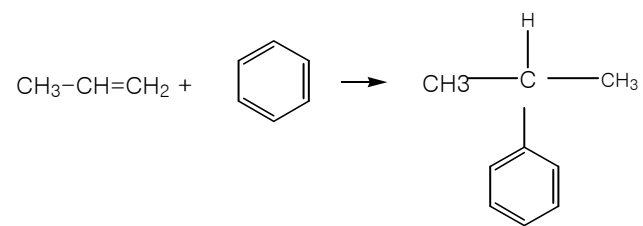


( ) glycerol .

(7) Disproportionation :

- an olefin is converted into shorter and longer chain olefins.





( )  $\text{C}_6\text{H}_5\text{OH}$  (Phenol)