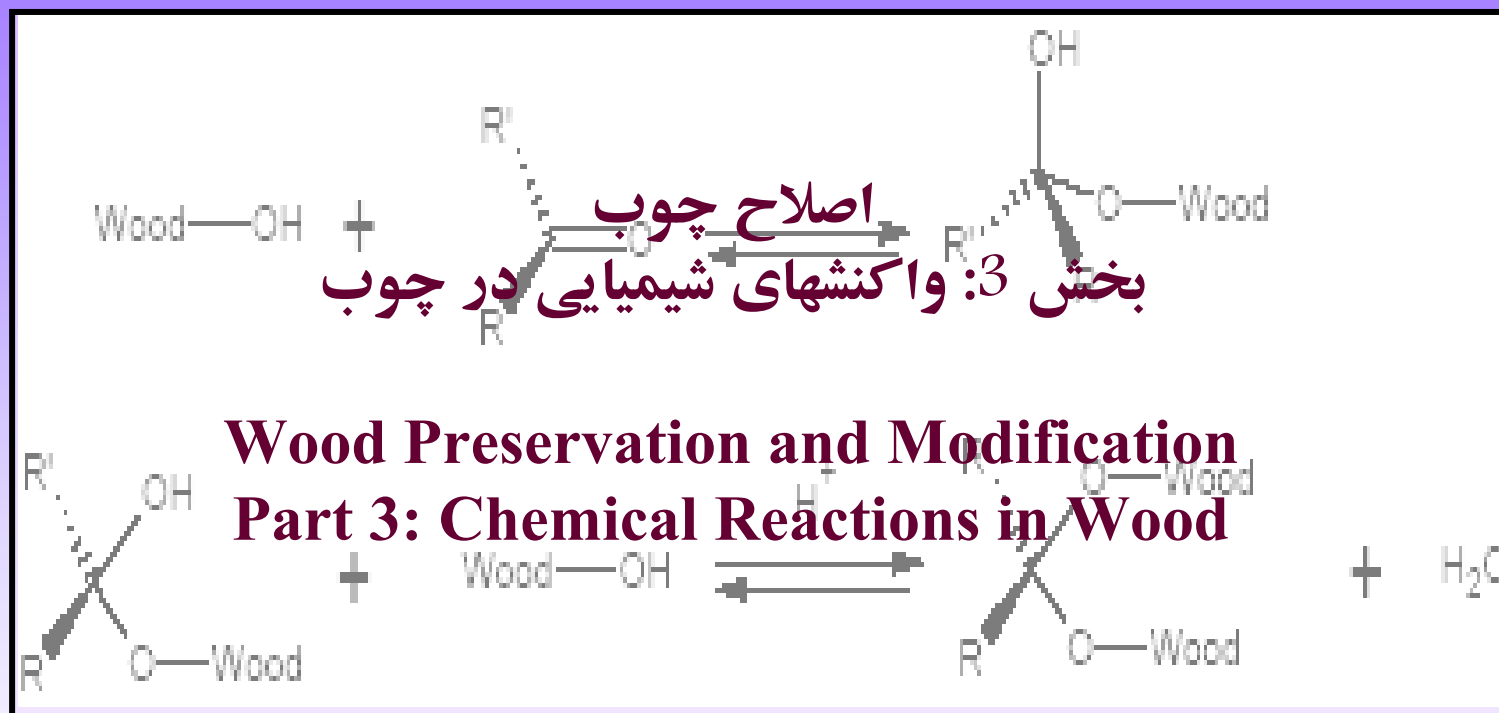
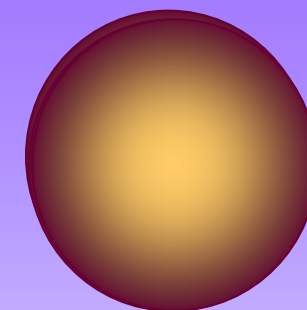
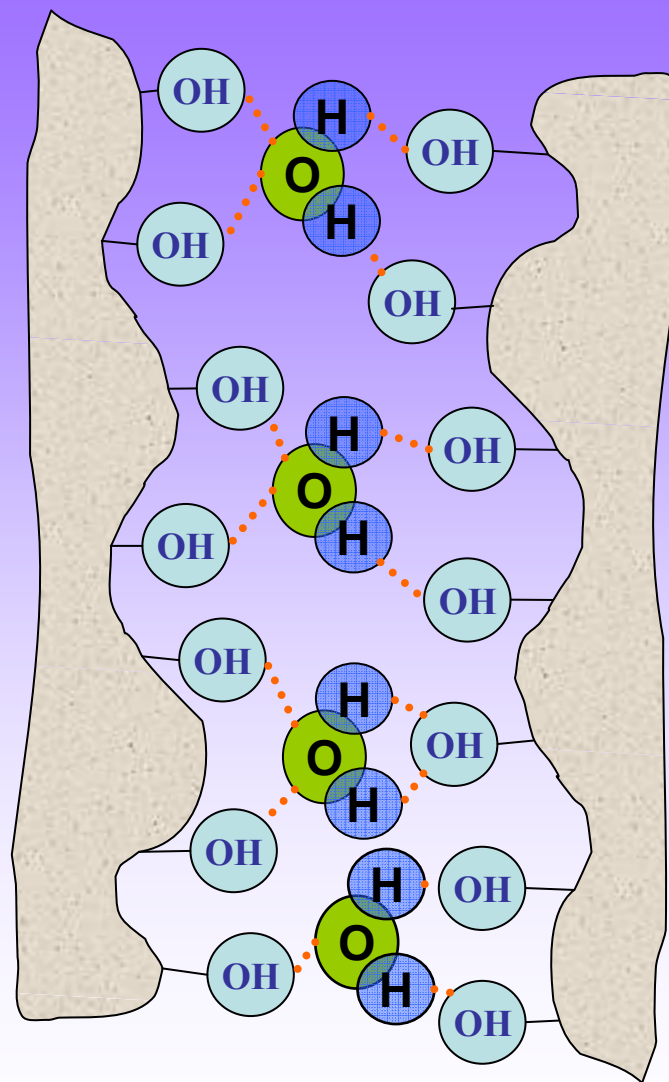




Substitution of **HYDROPHYLE** groups with **HYDROPHOBES** in cell walls during chemical reactions



HYDROPHOBES

واکنشهای شیمیایی Chemical Reactions

I. اتری شدن Etherification

II. استری کردن Esterification

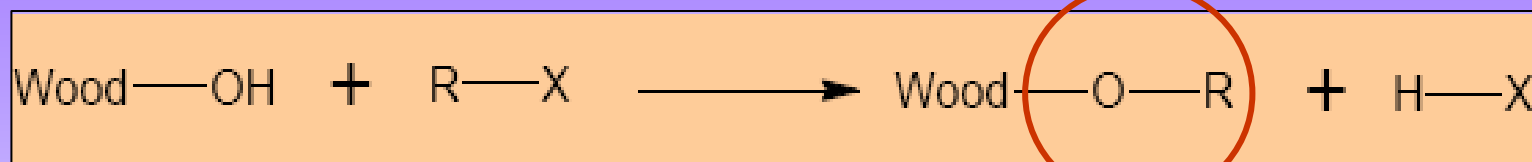
III. یورتان ها Urethanes

IV. اکسایش Oxidation

V. سیلیلاسیون Silylation

Wood & Lignocelluloses + Alkyl Halides

Etherified Wood



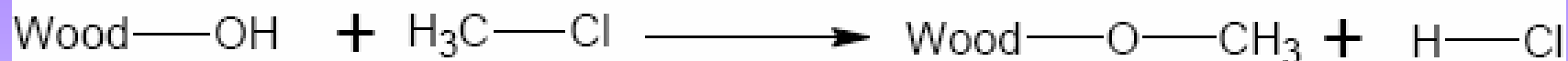
Ether bond

- Acrylonitrile
- Epoxides
- β -propionolactone (Acid condition)
- Di- methyl sulphate

واکنشهای اتری کردن Etherification Reactions



Wood & Lignocelluloses + Alkyl Chloride $\rightarrow$ Alkylation



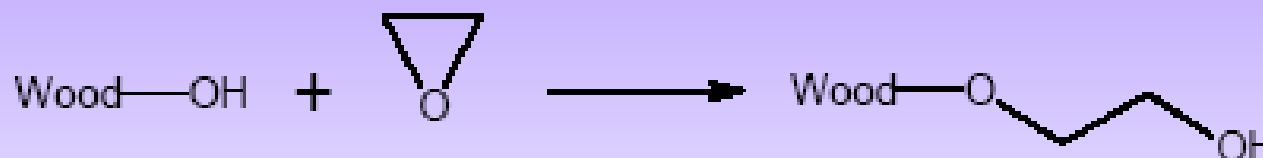
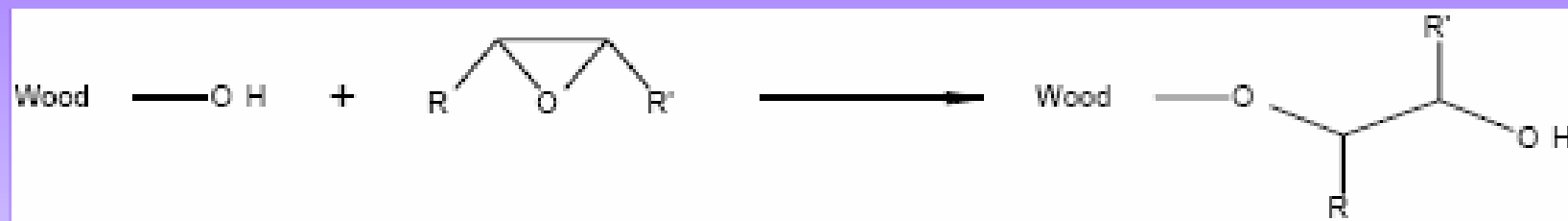
• Methyl chloride

***Alkyl-** Any of a series of univalent groups of the general formula $\text{C}_n\text{H}_{2n+1}$ derived from aliphatic hydrocarbons*

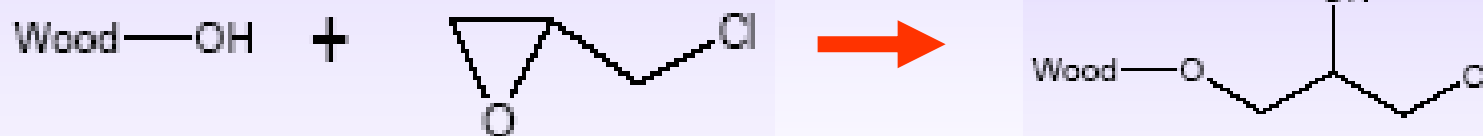
Wood & Lignocelluloses + Alkylen Oxide



Epoxidation



• Ethylene Oxide

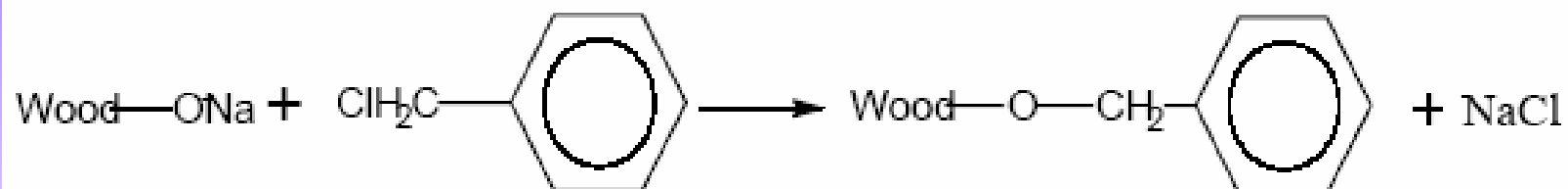


• Epichlorohydrin

Wood & Lignocelluloses + Benzylchloride

NaOH

Benzylation



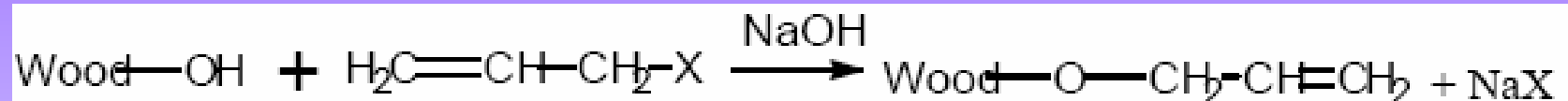
• Benzyl Chloride

Wood & Lignocelluloses + Allyl Halides

NaOH

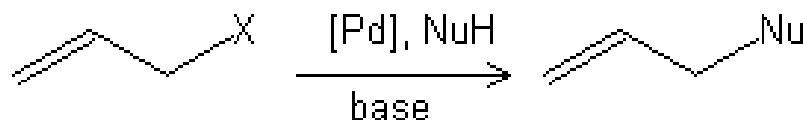


Allylation



- Allyl chloride
- Allyl bromide

Allyl- The univalent unsaturated organic radical C_3H_5 ; derived from propylene



NuH = malonae, beta-diketone, beta keto ester, enamine,
beta-keto sulfone, bis sulfone

$[\text{Pd}]_0 = \text{Pd}(\text{PPh}_3)_4, \text{Pd}_2(\text{dba})_3\text{CHCl}_3 + \text{PPh}_3, \text{Pd}(\text{OCOCH}_3)_2 + \text{PPh}_3$

base = sodium hydride

Wood & Lignocelluloses + Ethylenecyanide

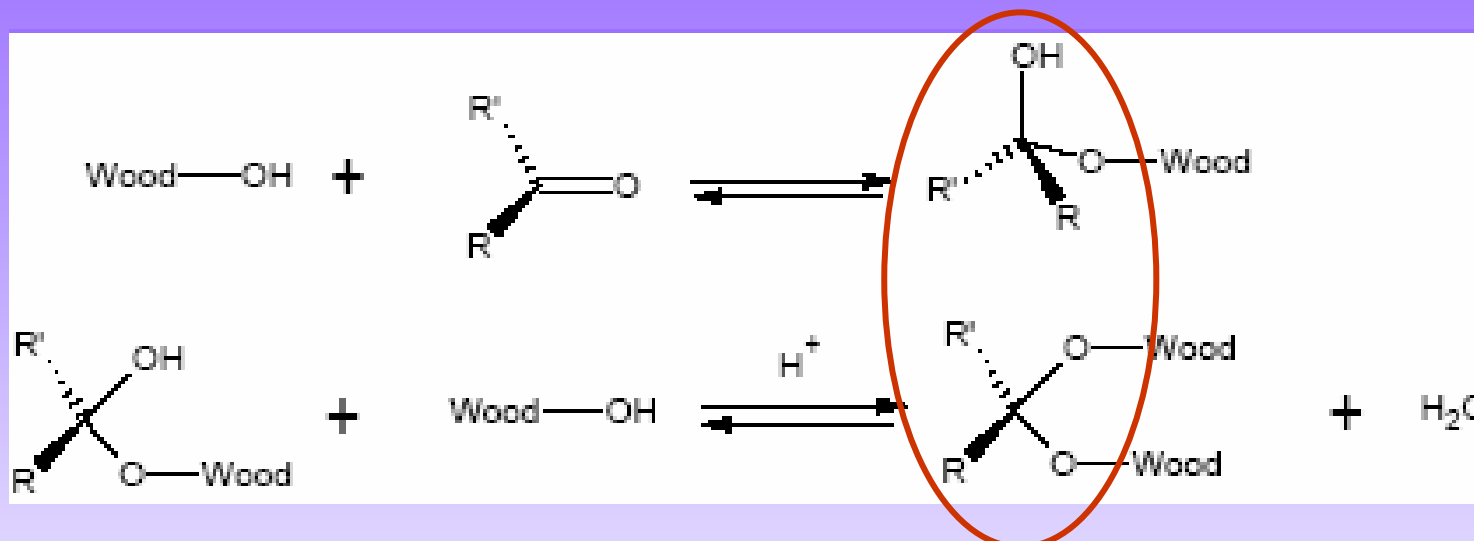
NaOH

Cyanoethylated wood



• Ethylencyanide

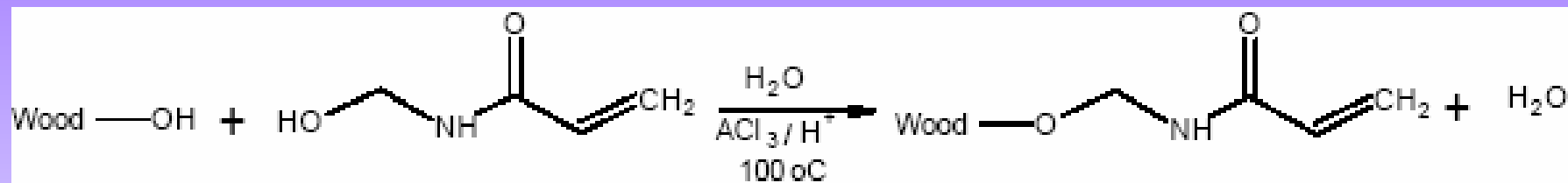
Wood & Lignocelluloses + Aldehyde or Keton ➔ Acetalation



- Formaldehyde
- Glutaraldehyde
- Glyoxal
- Dimethylol dihydroxyethylene urea (DMDHEU)

Acetal-Any organic compound formed by adding *alcohol molecules to aldehyde molecules*

Wood & Lignocelluloses + N-hydroxymethylacrylamide (NHMA) → Aminalation

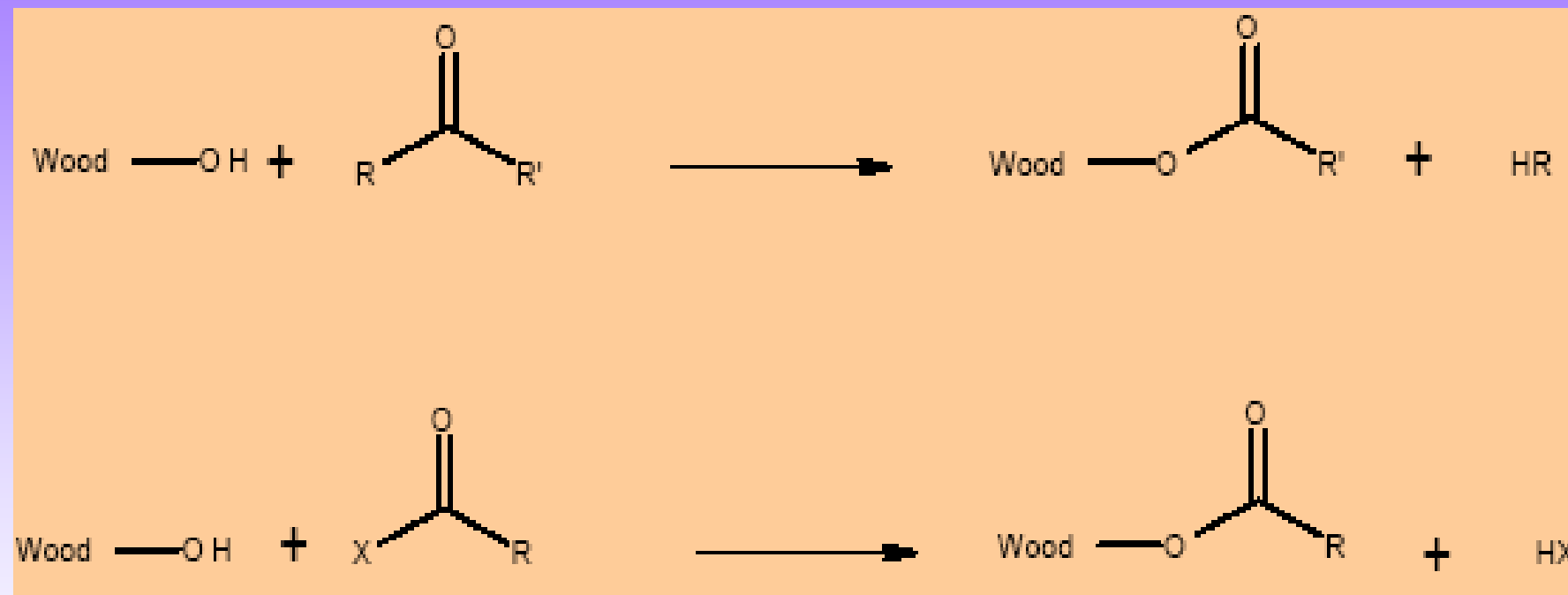


• N-hydroxymethylacrylamide (NHMA)

Wood & Lignocelluloses + Carboxylic acids or Anhydride acids



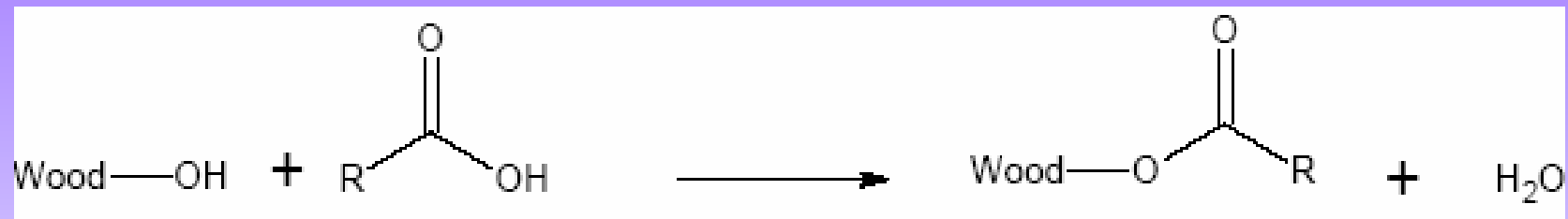
Esterified Wood



Wood & Lignocelluloses + Carboxylic acids



Carboxylated Wood

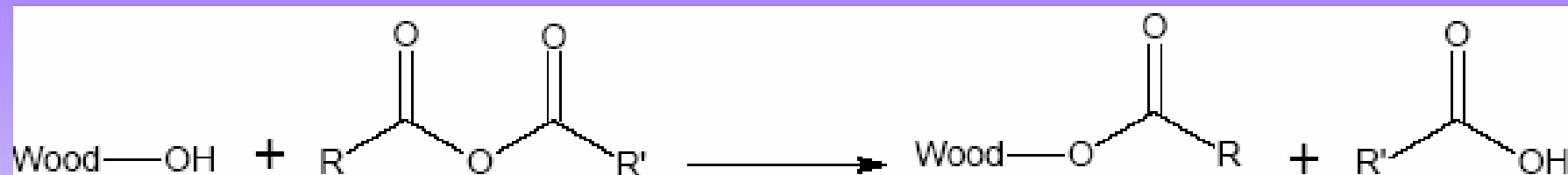


- Acetic acid
- Trifluoroacetic acid
- Malonic acid
- Succinic acid
- Glutaric acid
- Adipic acid
- Sebacic acid

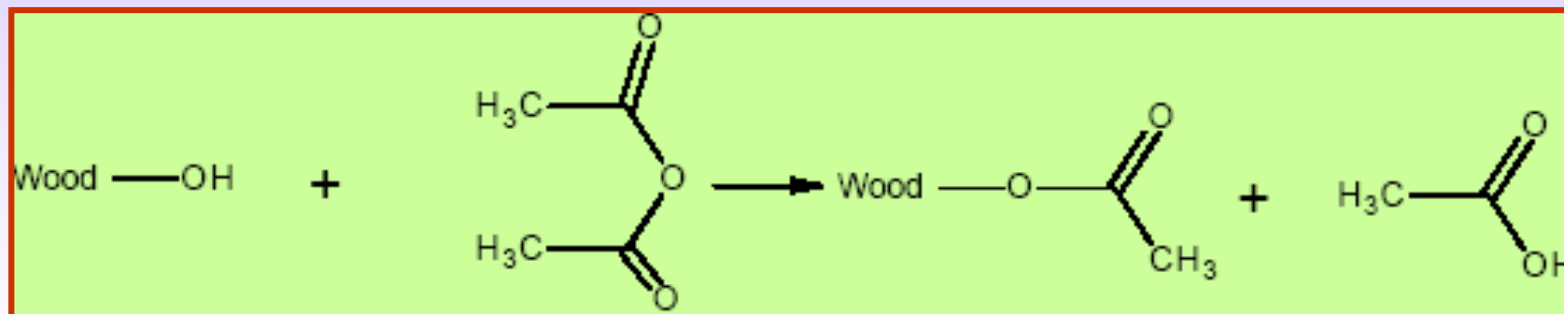
Wood & Lignocelluloses + Anhydrides



Esterified Wood



- Acetic anhydride
- Maleic anhydride



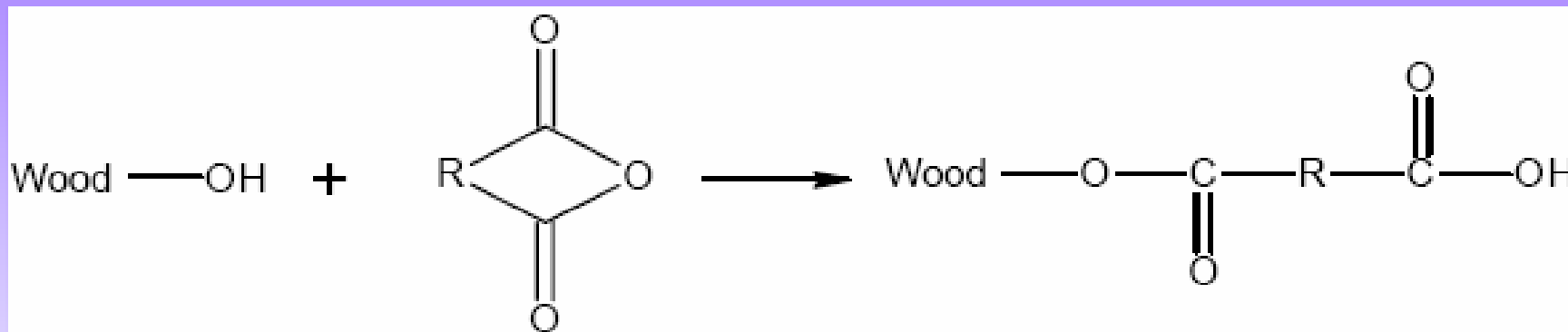
Wood & Lignocelluloses + Acetic anhydride



Acetylation

3.11. انیدریدهای دی کربوکسیلیک اسید Dicarboxylic acid anhydrides

Wood & Lignocelluloses + Dicarboxylic Anhydrides → Esterified Wood

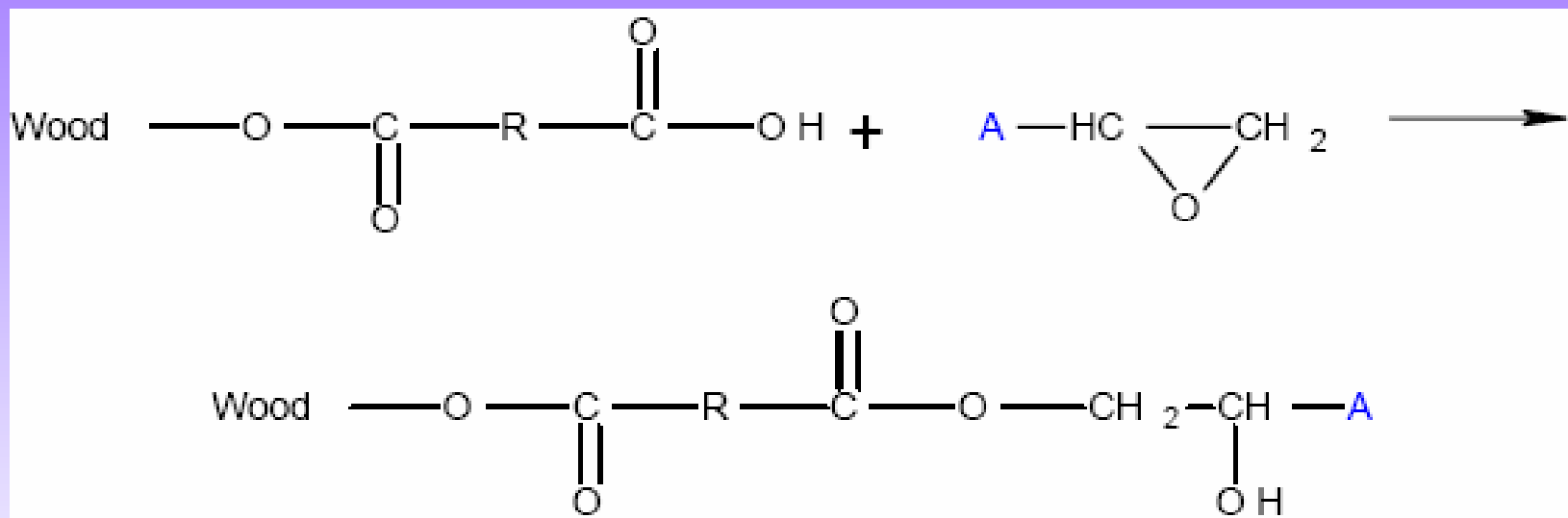


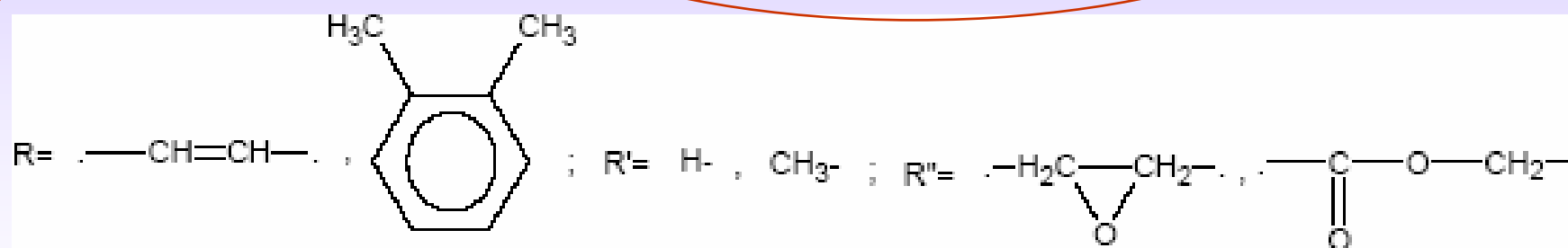
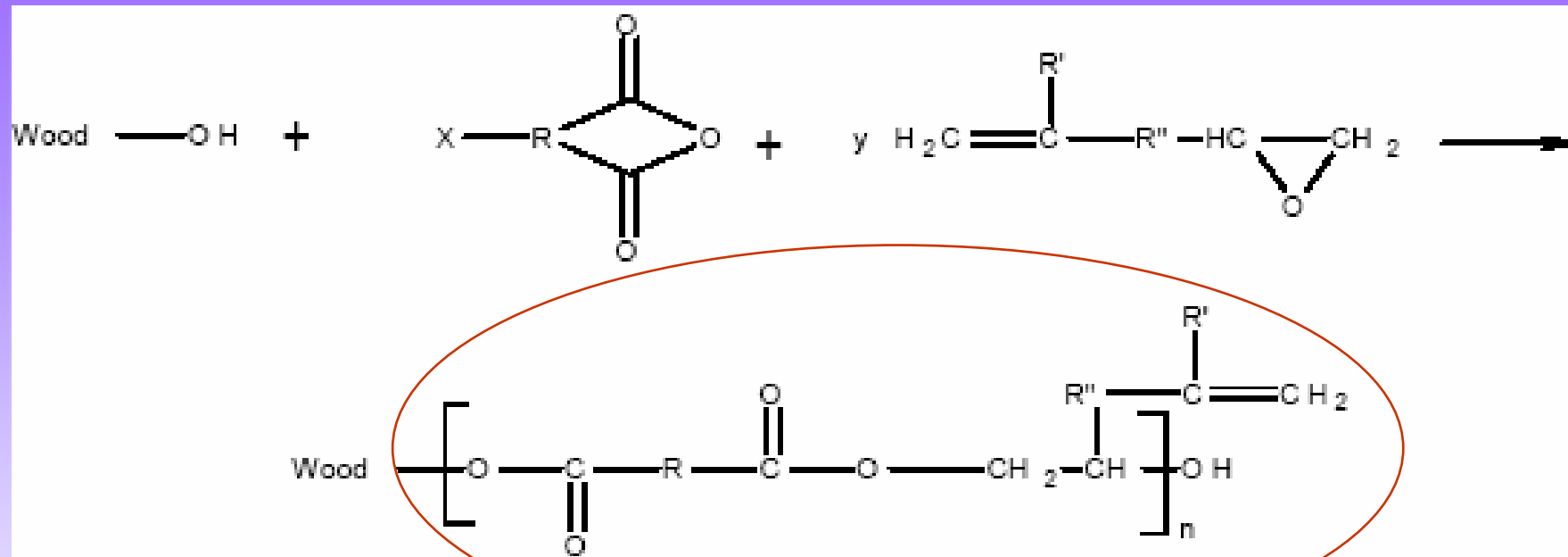
- Phthalic anhydride
- Maleic anhydride
- Succinic anhydride

Wood & Lignocelluloses + Epoxides



Oligoesterified Wood





Wood & Lignocelluloses + Epoxides

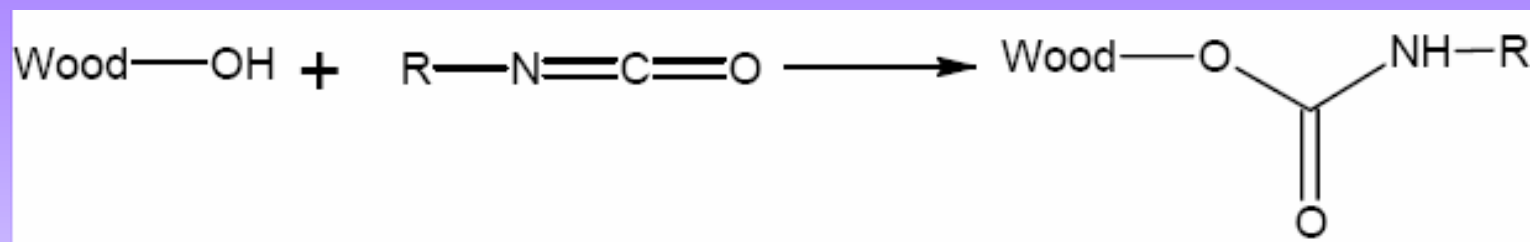


Oligoesterification

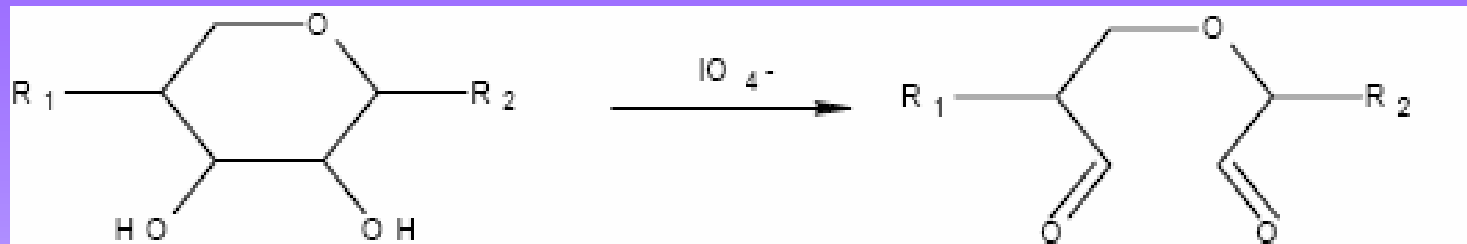
Wood & Lignocelluloses + Isocyanates



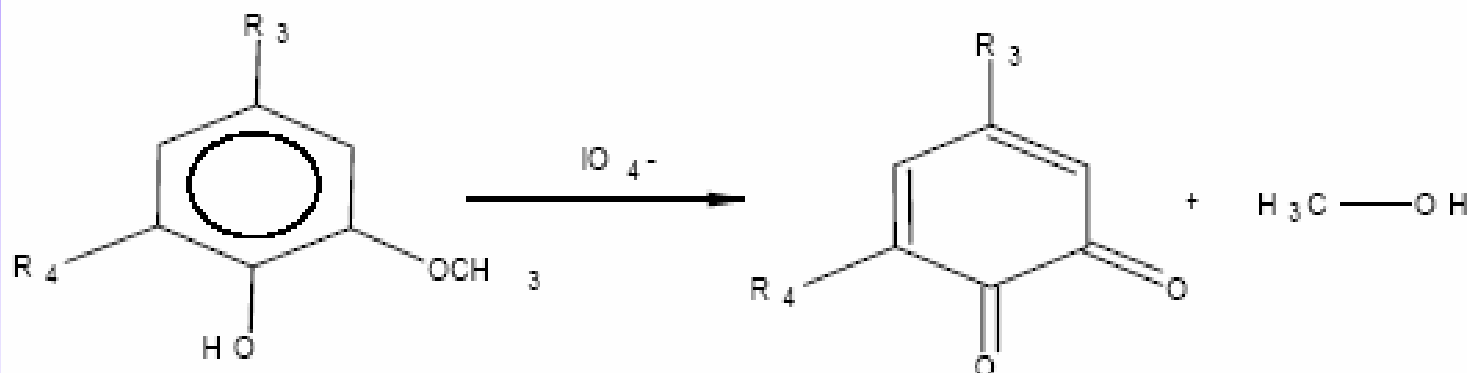
Urethanes



- Methyl- isocyanate
- Ethyl-isocyanate
- n-Propyl- isocyanate
- n-butyl-isocyanate
- 1,6-diisocyanate hexane
- Toluene-2,4-diisocyanate
- Phenyl-*p*-isocyanate



Holocellulose



Lignin derivatives

Wood & Lignocelluloses + Oxidizing agents



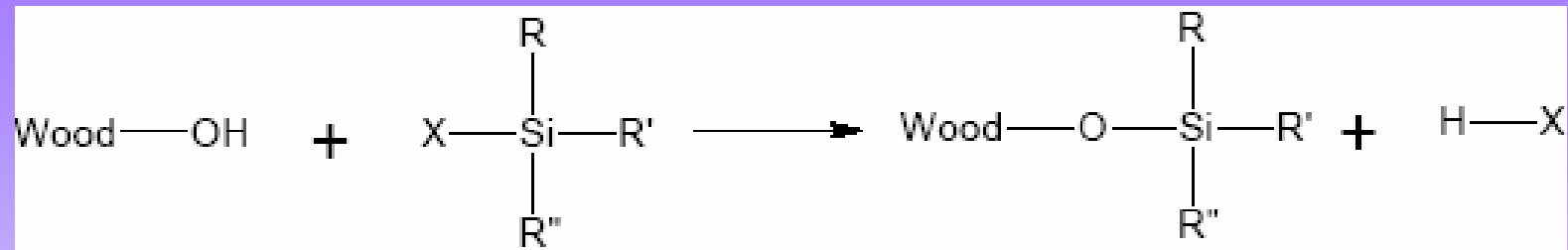
Oxidation

- Sodium periodate
- Periodic acid

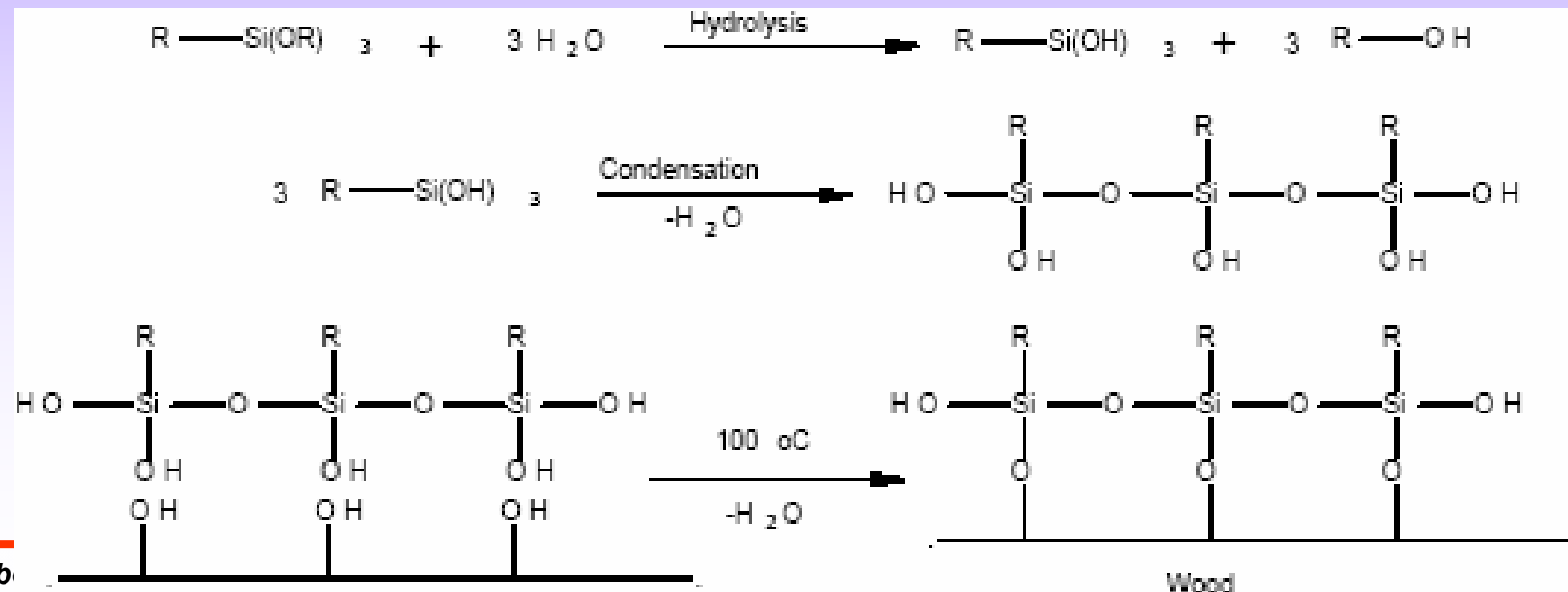
Wood & Lignocelluloses + Organic Silanes



Silylated Wood



- Chlorosilanes
- Alkoxysilanes



خسته نباشید.

20 5 2004

Behbood Mohebbi, Dep. of Wood & Paper Sciences, Faculty of Natural Resources, P.O. Box 46414-356, Noor-Iran Tel.: +98-122-6253101 (-3) , Fax: +98-122-6253499 ; E-mail: mohebbiyb@modares.ac.ir , www.tmu.ir/wood

