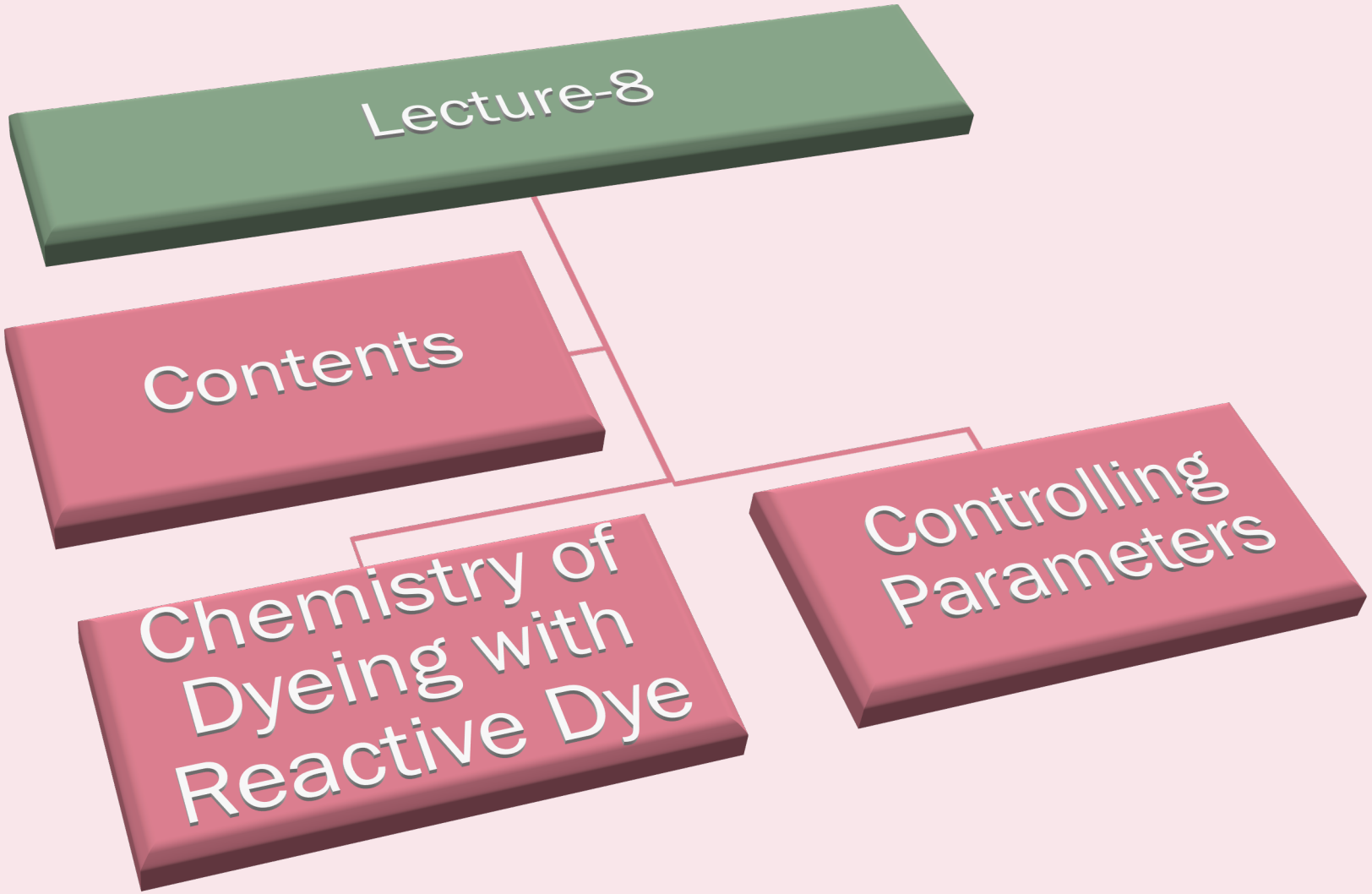

Lecture-8
Contents
Chemistry of Dyeing with Reactive Dye
Controlling Parameters

Dyeing mechanism of reactive dye

The dyeing mechanism of material with reactive dye takes place in 3 stages:

1. Exhaustion of dye in presence of electrolyte or dye absorption.
2. Fixation under the influence of alkali.
3. wash-off the unfixed dye from material surface.

Dyeing mechanism of reactive dye (Continued)

1. Dye absorption

When fiber is immersed in dye liquor, an electrolyte is added to assist the exhaustion of dye.

Here NaCl is used as the electrolyte.

This electrolyte neutralize the negative charge formed in the fiber surface and puts extra energy to increase dye absorption.

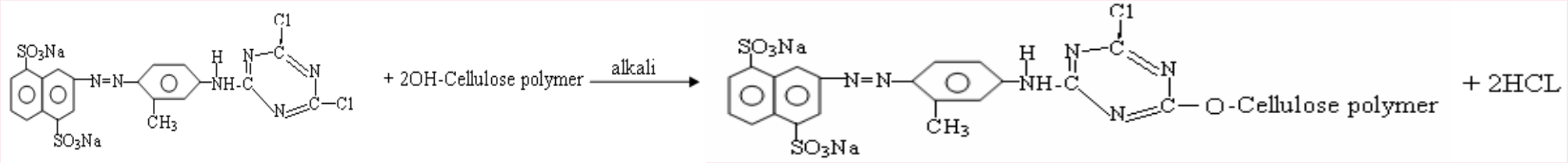
So when the textile material is introduces to dye liquor the dye is exhausted on to the fiber.

Dyeing mechanism of reactive dye (Continued)

2. Fixation

Fixation of dye means the reaction of reactive group of dye with terminal –OH or-NH_2 group of fiber and thus forming strong covalent bond with the fiber. This is an important phase, which is controlled by maintaining proper pH by adding alkali. The alkali used for this purpose depends on brand of dye and dyeing temperature. Here generally caustic soda, soda ash or $NaHCO_3$ is used as alkali depending upon reactivity of dye. They create proper pH in dye bath and do as the dye-fixing agent.

$$\text{1. D-SO}_2\text{-CH}_2\text{-CH}_2\text{-OSO}_3\text{Na} + \text{OH-Cell} \xrightarrow[\text{P}^{\text{H}}\ 10\text{-}12.5]{\text{Alkali}} \text{D-SO}_2\text{-CH}_2\text{-CH}_2\text{-O-Cell} + \text{NaHSO}_3$$



Dyeing mechanism of reactive dye (Continued)

3. Wash-off

As the dyeing is completed, a good wash must be applied to the material to remove extra and unfixed dyes from material surface.

This is necessary for level dyeing and good wash-fastness. It is done by a series of hot wash, cold wash and soap solution wash.

Dyeing mechanism of reactive dye (Continued)

Controlling Parameters/Factors

I) P^H

II) Temperature

III)Dyeing time.

IV)Liquor Ratio.

V) Concentration of electrolyte (salt)


Thank
You!