

The Color of Chemistry

Dyes, Dyeing and Chemical Bonding

Introduction

The art of dyeing dates back thousands of years to the use of natural dyes extracted from plants and animals. Some dyes, such as Tyrian purple obtained from shellfish, were so rare that only emperors and kings could afford to wear purple—hence the term “royal purple.” The modern dye industry started more than 150 years ago with the discovery of “mauve,” the first synthetic dye. Since then, thousands of dyes have been developed to work with all types of fabrics.

Concepts

- Chemical bonding
- Ionic bonds
- Polar vs. nonpolar bonds
- Hydrogen bonding

Background

Dyes are organic compounds that can be used to impart bright, permanent colors to fabrics. The affinity of a dye for a fabric depends on the chemical structure of the dye, fabric molecules and the interactions between them. Chemical bonding thus plays an important role in how and why dyes work.

The chemical structures of six common fabrics—wool, acrylic, polyester, nylon, cotton and acetate—are shown in Figure 1. Cotton and wool are natural fibers obtained from plants and animals while acrylic, polyester and nylon are synthetic fibers made from petrochemicals. Acetate, also called cellulose acetate, is prepared by chemical modification of natural cellulose. All of the fabrics, whether natural or synthetic, are polymers. These are high molecular weights, long chain molecules made up of multiple repeating units of small molecules. The structures of the repeating units are enclosed in brackets in Figure 1. The number of repeating units (*n*) varies depending on the fiber and how it is prepared.

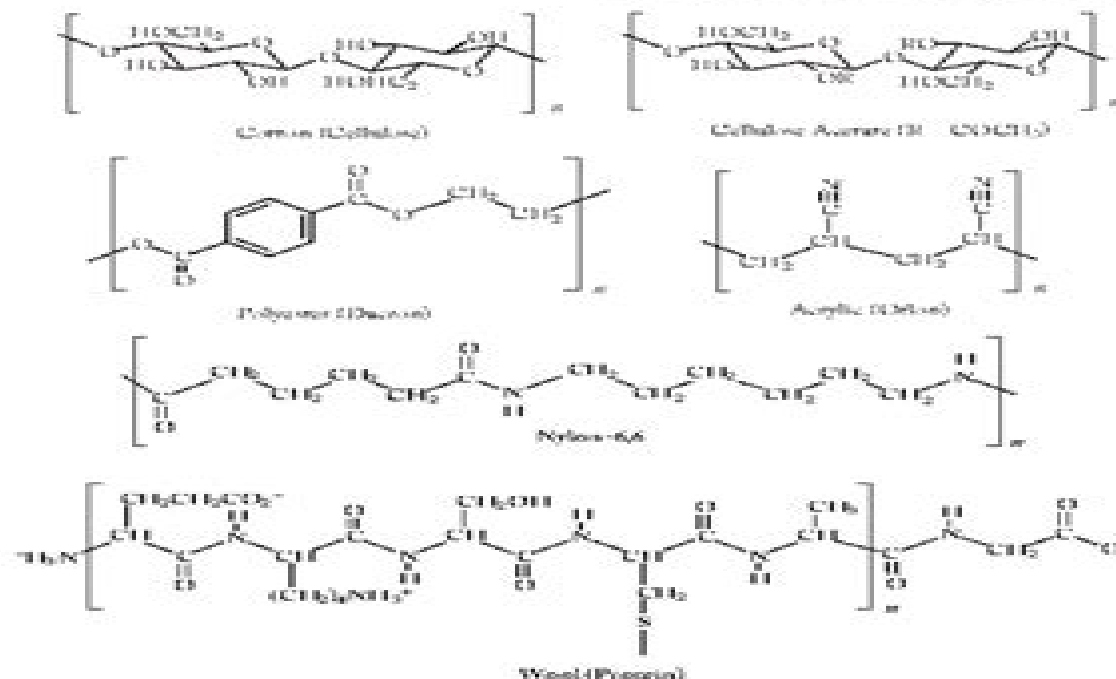


Figure 1. Chemical structures of fabric molecules.

Chemistry Of Dyes And Principle Of Dyeing By V A Shenai

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Technology of Textile Processing V. A. Shenai,1976

Fundamentals and Practices in Colouration of Textiles J N Chakraborty,J. N. Chakraborty,2015-05-05 This is a

comprehensive book that imparts technological skills about the colouration of textiles It discusses academic as well as shop floor aspects of colouration It also covers eco friendly enzymatic processing and differential coloured effects **Handbook**

of Textile and Industrial Dyeing M Clark,2011-10-25 Dyeing is one of the most effective and popular methods used for colouring textiles and other materials Dyes are employed in a variety of industries from cosmetic production to the medical sector The two volumes of the Handbook of textile and industrial dyeing provide a detailed review of the latest techniques and equipment used in the dyeing industry as well as examining dyes and their application in a number of different industrial sectors Volume 1 deals with the principles of dyeing and techniques used in the dyeing process and looks at the different types of dyes currently available Part one begins with a general introduction to dyeing which is followed by chapters that examine various aspects of the dyeing process from the pre treatment of textiles to the machinery employed Chapters in part two then review the main types of dyes used today including disperse dyes acid dyes fluorescent dyes and many others for a diverse range of applications With its distinguished editor and contributions from some of the world s leading authorities the Handbook of textile and industrial dyeing is an essential reference for designers colour technologists and product developers working in a variety of sectors and will also be suitable for academic use Examines dyeing and its application in a number of different industrial sectors Deals with the principles of dyeing and techniques used in the dyeing process as well as types of dyes currently available Chapters review various dye types right through to modelling and predicting dye properties and the chemistry of dyeing **Proceedings of the International Conference on Systems, Science, Control, Communication, Engineering and Technology 2015** Kokula Krishna Hari K,Keerthivasan M,D Bhanu,2015-08-10 ICSSCCET 2015 will be

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Regenerative Ecosystems in the Anthropocene Amar K. J. R. Nayak, 2024-07-25 The book offers a transdisciplinary eco systemic framework for analysis of ecosystems It uses eight dimensions economic social political environmental and 40 factors to diagnose degenerating ecosystems and to synthesize regenerative ecosystems amid growing uncertainty and inequality in the Anthropocene Chapter 1 broadly defines the all interacting evolving systems science AIESS approach in terms of its eco systemic and transdisciplinary action research methodology Chapter 2 provides a detailed explanation of the AIESS approach through the four concepts of interconnectedness interdependence interactions and intent to diagnose degeneration and synthesize regenerative systems Part 1 of the book discusses the issues and approaches to Regenerativeness Part 2 3 4 and 5 illustrate cases of regenerative systems in different ecosystems viz natural rural indigenous urban and industrial ecosystems Not only the researchers and scholars in systems science systems dynamics systems design and sustainable transition strategies but also the policy makers corporate leaders and development experts will greatly benefit from this book 1 Presents a ground breaking explanation of the science of change in the Anthropocene and in epochs prior to it through its all interacting evolving systems science framework 2 Provides a unique transdisciplinary eco systemic framework as a methodology to diagnose the complex degenerating ecosystems and to synthesize regenerative ecosystems in different geographies of the world 3 Through various cases from different ecosystems viz natural ecosystems rural indigenous ecosystems urban ecosystems and industrial ecosystems the book presents the challenges as well as the steps and processes to synthesize regenerative ecosystems **Textile Dyer & Printer**, 1992 **The Indian Textile Journal**, 1999 **Journal of the Indian Chemical Society**, 1997 Resume of Papers ... Technological Conference South India Textile Research Association. Joint Technological Conference, 2001 **The Natural Dyes of Nepal** Laxmi Malla, 1993

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