

Organic Colorants

Undergraduate 3 credit course in Polymer Engineering curriculum

Amirkabir University of Technology

Chapter 1: Introduction to organic colorants (definition: color, colorant, dye, dyestuff, pigment, raw materials, intermediates, dyes vs. pigments, classification of colorants).

Chapter 2: Substitution reactions on aromatic compounds (electrophilic and nucleophilic substitution reactions and their mechanism, benzidine rearrangements).

Chapter 3: Synthesis of intermediates based on benzene, naphthalene and anthraquinone (sulfonation, nitration, reduction, introduction of the hydroxyl group, introduction of amino and alkoxy groups, oxidation, halogenation, N-acylation, N-alkylation, Friedel-Crafts reaction. study of mechanism of arynes. alkali fusion of sulphonated aromatic derivatives. Buchere reaction).

Chapter 4: Diazotization and coupling (diazotization methods, effect of basic strength of aromatic amines, structure and reactivity of azo compounds- Hammett constant, azo-hydrazone tautomerism in azo colorants, equilibrium state of protonated amino azo colorants).

Chapter 5: Spectroscopic properties of colorants (λ_{\max} , ϵ_{\max} , tinctorial strength, Beer-Lambert law, bathochromic, hypsochromic, hyperchromic, hypochromic, halochromic and solvatochromic effects, effect of various functional groups on spectroscopic properties of colorants, phototropy phenomenon, polarization, Michler's hydrol).

Chapter 6: Colour and Constitution (light and substance interaction, Witt theory, chromophore, auxochrome and chromogen, phototropy phenomenon, polarization, Michler's hydrol, valence bond theory, molecular orbital theory).

Chapter 7: Organic pigments (importance and application of organic pigments, various organic pigments types. azo pigments (mono-, dis-, tris- and tetrakis-), quinacridone, phthalocyanine, isoindoline, diketopyrrolo-pyrrole), perylene and perinone, lacquer and toners).

Chapter 8: Manufacturing process of organic pigments (synthesis, micronization, and surface treatment, application of organic pigments).

References

- 1- P.F. Gordon and P. Gregory Organic chemistry in colour (1983).
- 2- Fierz David and Blangery, Fundamental process of dye chemistry (1965).
- 3- Morrison and Boyds, Organic chemistry (1987).
- 4- W. Herbst and K. Hunger, Industrial Organic Pigments (2004).
- 5- Organic reaction mechanism, John Wiley (1965)
- 6- , Venkataraman, The chemistry of synthetic dyes, 8 vol. (1978).
- 7- A. I. Vogel, A text book of practical organic chemistry, (1977).