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Chromophore et auxochrome pdf download torrent gratuit free

Basic auxochromes Auxochrome vs chromophore Auxochrome is a Greek word arising from two word roots; 'auxo' meaning "to increase" and 'chrome' meaning "color". Eg: -C=C-, C = O Any substance (groups) which absorbs radiation at particular wave length this may or may not impart colour to the compound. Deviations of Absorption laws Absorption Vs Concentration Straight line Positive deviation Negative deviation Concentration Absorbance 7 8. $a = k' / 2.303$ 6 7. Bathochromic shift (red shift) - a shift to longer λ ; lower energy ii. Negative deviation results when a large change in concentration produces smaller change in absorbance. Hence, they are also called as "color helpers". Auxochromes are molecules which are attached to non ionizing compounds yet retain their ability to ionize and affect the ability of absorbing light when attached to a chromophore. 18 19. Simple conjugated chromophores such as , - unsaturated ketones have high ϵ_{max} values from 10,000 - 20,000. Compounds which possess $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transitions will show absorption in the vacuum UV region around 150nm and 190nm, so there won't be presence of any kind of chromophores within them. $d\epsilon/dc$ = decrease in intensity of radiation - $d\epsilon/dl$ = rate of decrease of intensity of radiation with thickness of the absorbing medium. Chromophore is that part of the molecule which when exposed to visible light will absorb and reflect a certain color. CONTENTS 1. 19 20. AUXOCHROME Auxochrome is defined as any group, which does not itself act as a chromophore but whose presence brings about a shift of the absorption band towards the red end of the spectrum (longer wavelength) Chromophore + Auxochrome = newer chromophore Auxochrome is a colour enhancing group. These are responsible for the absorption of different radiations with different wavelengths based on the energy of the electron. With respect to the Chromophore concept and electronic transition the following points can be noted: Spectrum with a band near 300 nm may contain 2 - 3 conjugated units. The new chromophore that is formed is of have a different value of absorption maximum as well as the extinction coefficient. Positive deviation results in when a small change in concentration produces a greater change in absorbance. The two types of deviations are positive and negative deviations. If an auxochrome is present in the meta position of the chromophore, then there is no change in the color. All substances like dyes produce colors by absorption of visible light owing to the various constituent compounds. Summary: In order to prepare dyes, auxochromes are attached to chromophores so as to achieve the deep color intended for the product. The intensity of the absorbed radiation can be given as $I_a = I_0 - I = I_0 - a'cx$, where a = extinction coefficient of the absorbing medium. Chromophores do not absorb light without the requisite contents but with the presence of an auxochrome there is a shift in the absorption of these chromogens. Instrumental deviations - stray radiation, improper slit width, fluctuations in single beam and monochromatic light is not used. K' = molar absorption coefficient. We have an understanding that chromophores are atomic configurations with presence of delocalized electrons. • CHROMOPHORE 2 3. Instrumental Methods of Chemical Analysis by CHATWAL. To convert basic dyes to acidic dyes, the negatively charged sulphonic groups are often used. 11 12. Physicochemical changes in solutions - factors like association, dissociation, ionization (change in pH), faulty development of colour (incompletion of reaction). The absorption with ϵ_{max} value between 100 - 10,000 consists of an aromatic system. 5 6. The electromagnetic spectrum has a very wide variation in wavelengths but the human eye visualizes only short wavelength radiation. 1 2. 9 Reasons 10. For instance, benzene does not have any color of its own, but when it is combined with the nitro group which acts as a chromophore; it imparts a pale yellow color. 8 9. Rate this post! (2 votes, average: 5.00 out of 5) 1. $d\epsilon/dc$ = decrease in intensity of radiation - $d\epsilon/dl$ = rate of decrease of intensity of radiation with thickness of the absorbing medium. THE CHROMOPHORE CONCEPT, ABSORPTION LAWS AND LIMITATIONS. LAMBERTS LAW Lambert's law - when a beam of monochromatic radiation passes through a homogenous absorbing medium, the rate of decrease of intensity of radiation with the thickness of the absorbing medium is proportional to the intensity of incident radiation. The electrons which were in the resting state are elevated into the excited state because of the energy incorporated into it. CHROMOPHORE CONCEPT 10 11. 24 CHROMOPHORIC STRUCTURE 13 Group Structure nm Carbonyl $> C = O$ 280 Azo -N = N- 262 Nitro -N=O 270 Thioketone -C =S 330 Nitrite -NO2 230 Conjugated Diene -C=C=C- 233 Conjugated Triene -C=C=C=C- 268 Conjugated Tetraene -C=C=C=C=C- 315 Benzene 261 14. Absorption bands near 270 - 350 nm with a very low intensity of ϵ_{max} 10 - 100 are due to $n \rightarrow \pi^*$ transition of the carbonyl groups. Image Credit : Auxochromes002.png Custom Search Help us improve. - $d\epsilon/dt$ $I_c - d\epsilon/dt = K'I c$ $I =$ Intensity of incident radiation passing through a thickness of " t " of the medium. Hypochromic effect - a decrease in intensity Chromophore 16 17. Auxochrome increases the color of any organic substance. K = propionate constant or absorption coefficient. 12 13. - $d\epsilon/dt$ $I - d\epsilon/dt = KI$ $I =$ Intensity of incident radiation passing through a thickness of " t " of the medium. • ABSORPTION LAWS a)BEERS LAW b)LAMBERTS LAW 2. Auxochromes are a bunch of atoms that when combined with an appropriate chromophore heighten or enhance the color. Auxochrome is a group of atoms which will impart a particular color when attached to a chromophore but when present alone, will fail to produce that color. The effect is due to its ability to extend the conjugation of a chromophore by sharing the nonbonding electrons. Hypsochromic shift (blue shift) - shift to shorter λ ; higher energy iii. $c =$ Concentration of the solution in moles/litre. Amino groups are examples of positively charged whereas carboxyl, hydroxyl and sulphonic groups are examples of negatively charged auxochromes. A chromophore gives the dye the property of absorbing different radiations whereas auxochrome imparts it with the property of being colored. Chromophores are represented as nitrogen, carbon, oxygen and sulphur which usually have single or double bonds. INTRODUCTION BEERS LAW LAMBERTS LAW DEVIATIONS 3 ABSORPTION LAWS 4. DEVIATIONS: When a non linear curve is obtained, the system is said to undergo deviation. Azobenzene is an example of a dye which contains a chromophore. If the energy incorporated is changed, automatically the wavelength of the radiation it absorbs will also change and the compound will appear colored. Auxochromes are commonly called as 'color helpers' or 'color intensifiers'. Hyperchromic shift: - Shift due to increase in intensity. ϵ_{max} increase - Due to the introduction of auxochrome - Ex: Pyridine - 257 nm and ϵ_{max} is 2750; 2 - methyl pyridine 262 nm and ϵ_{max} is 3560 Hypochromic shift: - Inverse of hyperchromic shift - i.e., decrease of intensity - introduction of any group to the compounds which is going to alter the molecular pattern of the compound results in a hypochromic shift. Elementary Organic Spectroscopy by Y.R.SHARMA 23 24. Auxochrome is a group of atoms which is functional and has the capability to alter the capacity of the chromophore to reflect colors. Chromophores are constituents of molecules that absorb or reflect certain colors when light fall on them. Dyes containing auxochromes are basically aromatic compounds and include the presence of aryl rings which have delocalized electron systems. Chromophores with double covalent bond appear to be colored as a result of the heightened state of the electrons. 14 15. Electrons present in the chromophore get excited from the ground level to the excited state when visible light falls on them. Absorption and intensity shifts Bathochromic shift: - Absorption shifted towards longer wavelength - Change of solvent/ auxochrome -Red shift / bathochromic shift - $n \rightarrow \pi^*$ transition for carbonyl compounds experiences bathochromic shift when the polarity of the solvent is decreased. Substituents may have any of four effects on a chromophore i. Benzene - 255nm (ϵ_{max} - 203) Aniline - 280nm (ϵ_{max} - 1430), so the auxochrome group is - NH2 Ex: - OH, - OR, -NH2, -NHR, -NR2, -SH etc., 15 16. Pharmaceutical/Clinical/Cosmetic Field Biochemical/Genetic field Analytical Chemistry Dye/Ink/Paint industry Environment/Agriculture Metals/Films Petrochemical sector 22 23. Hypsochromic shift or effect: - Shift towards shorter wavelength - Blue shift/ hypsochromic shift - Change of solvent towards higher polarity or removal of conjugation - Aniline - 280 nm (conjugation of pair of electrons of nitrogen with benzene ring) - In acidic solution it will form - NH+ 3, due to the removal of - conjugation or removal of lone pair of electrons, the absorption takes place at lower wavelength 203nm - this is called Hypsochromic shift. Chromophores also alter the energy in the delocalized systems. 200 nm 700 nm e Hypochromic Hypsochromic Hyperchromic Bathochromic 17 18. 4 5. APPLICATIONS OF UV Qualitative analysis Detection of impurities Quantitative analysis Molecular weight determination Dissociation constant Chemical kinetics Tautomeric equilibrium 21 22. REFERENCES Instrumental Analysis by SKOOG. BEERS LAW When a beam of monochromatic radiation is passed through a solution of an absorbing substance, the rate of decrease of intensity of radiation with thickness of the absorbing solution is proportional to the intensity of incident radiation as well as the concentration of the solution. - ex: biphenyl absorption is at 250 nm and 19000 ϵ_{max} - Whereas 2 -methyl biphenyl has an absorption of 237 nm and 10250 ϵ_{max} 20 21. They are used together to make dyes. CHROMOPHORE Chromophore - Any isolated covalently bonded group that shows a characteristic absorption in the UV/visible region. Chromophores types: The groups which contain π electrons and undergo $\pi \rightarrow \pi^*$ transitions The groups which contain both π and n electrons and undergo $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$ transitions. Instrumental analysis by BRAUN. Hyperchromic effect - an increase in intensity iv. Auxochromes are classified as either positively charged or negatively charged. Let, I_0 be the intensity of the incident radiation I be the intensity of the radiation after passing through the medium.

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