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METAL ION INDICATORS, MASKING AND DEMASKING REAGENTS

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USAGE OF pM INDICATORS IN COMPLEXOMETRIC TITRATIONS

The equivalence point in complexometric titrations is invariably observed by the help of pM indicators. The relationship amongst pM, concentrations of ligand, chelate complex and stability constant may be established by the following equations : Assuming K as the stability constant, we have :

- $K = \frac{[MX]}{[M][X]}$

or $[M] = \frac{[MX]}{[M][K]}$

or $\log [M] = \log [MX] / [X] - \log K$

or $p[M] = \log [X] / [MX] - pK$



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- **Now, considering Eq. (a), if a solution is made in such a manner that $[X] = [MX]$, we have : $pM = -pK$ or $pM = pK'$... (b)**
where, K' is the dissociation constant. From Eq. (b)
- **it may be concluded that a solution having equal activities of free chelating agent and the metal-complex formed, the concentration of metal ions shall remain almost constant and would be buffered exactly in a similar fashion as are H^+ ions in a pH-buffer.**



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PM INDICATOR :

- **It is a dye that serves as a chelating agent to yield a dye-metal complex, which apparently differs in colour from the original dye, besides possessing a lower stability constant than the corresponding chelate-metal complex.**
- **Hence, the colour imparted to the solution is mostly attributed due to the dye-complex formed until the end-point, when an equivalent amount of sodium-EDTA has been incorporated.**



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- **The critical point at which the metal-dye complex decomposes to yield free-dye on addition of the slightest excess of sodium-EDTA, is distinctly shown by a visible change in colour.**
- **Examples : (i) Mordant Black 2 : (Syn. : Eriochrome Black T ; Solochrome Black T)**
- **Murexide : (Syn. : Ammonium Purpurate)**



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MASKING AGENT

where one or two ions present in a mixture of cations is specifically required to be determined with a view to eliminate completely the possible effects of unwanted impurities that may enhance the titre value, a third substance is added, which is known as the Masking Agent.

E.G, CYANIDE(CN⁻)



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DE MASKING AGENT

Opposite of masking agent where the masked agent is returned back to its previous state or original state to determine its concentration

e.g- chloral hydrate



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THANK YOU