BIOMOLEKULEN ESPEKTROSKOPIA: FORMULAK

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Espektroskopiaren oinarriak

$E = h\nu = h\frac{c}{\lambda}$ $c = \lambda\nu$ $\nu = 1/\lambda$

$E_J = J(J+1)\frac{\hbar^2}{2I}$ $\varepsilon_J = J(J+1)\frac{h}{8\pi^2 cI}$ $B = \frac{h}{8\pi^2 cI}$

$I = \frac{m_1 m_2}{m_1+m_2} r_0$

$E_V = (v+\frac{1}{2})hc\tilde{v}$ $E_V = (v+\frac{1}{2})\hbar w$ $\tilde{v} = \frac{1}{2\pi c} w$

$w = \sqrt[2]{\frac{k}{m}}$ $m = \frac{m_1 m_2}{m_1+m_2}$

$\frac{n_2}{n_1} = e^{-\frac{\delta E}{kT}}$

Argi ikusgaia

$T = \frac{I}{I_0}$ $A = -logT$ $A = \varepsilon cl$

Fluoreszentzia

$\phi = \frac{k_F}{k_F+k_{NR}}$ $I = I_{abs}\phi$ $\tau = \frac{1}{k_F+k_N R}$

$\tau_N = \frac{1}{k_F}$ $\tau_N = \frac{\tau}{\phi}$

Fluoreszentziaren iraungitzea

$\frac{F_0}{F} = 1 + K_{SV}[Q]$ $K_D = k_q\tau$ $\frac{F_0}{F} = \frac{\tau_0}{\tau}$

$\frac{\tau_0}{\tau} = 1 + k_q\tau_0[Q]$ $K_s = k_q\tau$

$\frac{F_0}{F} = (1+K_D[Q])(1+K_S[Q])$

FRET

$k_T = (\frac{1}{\tau_d})(\frac{R_0}{R})^6$ $E = 1 - \frac{\tau_{da}}{\tau_d}$ $E = 1 - \frac{\phi_{da}}{\phi_d}$

$R = (\frac{1}{E} - 1)^{1/6} R_0$

Anisotropia

$P = \frac{I_{\parallel} - I_{\perp}}{I_{\parallel} + I_{\perp}}$ $r = \frac{I_{\parallel} - I_{\perp}}{I_{\parallel} + 2I_{\perp}}$ $r_0 = \frac{2}{5}\frac{(3cos^2\beta - 1}{2})$

$r = \frac{I_{VV} - GI_{VH}}{I_{VV} + 2I_{VH}}$ $G = \frac{I_{HV}}{I_{HH}}$ $r = r_b f_b + r_a f_a$

$f_B = \frac{(r - r_F)}{(r_B - r_F)}$ $K = \frac{f_B}{f_F}$ $\frac{r_0}{r} = 1 + (\frac{\tau}{\theta})$

$\theta = \frac{\eta V}{RT} = \frac{\eta M}{RT}(\bar{v} + h)$

Denboran ebatzitako fluoreszentzia

$Ln(I(t)) = Ln(I_0)(\frac{-t}{\tau})$ $m = \frac{AC_{em}/DC_{em}}{AC_{ex}/DC_{ex}}$

Argiaren dispertsioa

$\frac{I_\theta}{I_0} = \frac{8\pi^4\alpha^2}{r^2\lambda^4}(1 + cos^2\theta)$ $R_\theta = \frac{I_\theta}{I_0}\frac{r^2}{1 + cos^2\theta}$ $R_\theta = \frac{8\pi^4\alpha^2}{\lambda^4}$

$\frac{I_\theta}{I_0} = \frac{2\pi^2 n_0^2 (dn/dC)^2}{r^2\lambda^4 N} CM(1 + cos^2\theta)$

$\frac{KC}{R_\theta} = (\frac{1}{M} + 2A_2C)\frac{1}{P_\theta}$ $P_\theta = 1 + \frac{16\pi^2 n_0^2 R_g^2}{3\lambda^2} sin^2(\frac{\theta}{2})$

$R_H = \frac{kT}{6\pi\eta D}$ $\zeta = [EM \times \eta]/\varepsilon$

NMR

$\Delta E = hv = \frac{\gamma h B_0}{2\pi}$ $\frac{N_\alpha}{N_\beta} = e^{\frac{\Delta E}{kT}}$ $\delta = \frac{\nu - \nu_{ref}}{\nu_0} \times 10^6$