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Cox–Yates equation

A modification of the Bunnett–Olsen equation of the form:

$$\log_{10}\left(\frac{[\mathrm{SH}^+]}{[\mathrm{S}]}\right) - \log_{10}[\mathrm{H}^+] = m^* X + \mathrm{pK}_{\mathrm{SH}^+}$$

is the activity function

$$\log_{10}\left(\frac{\gamma_{\mathrm{S}}\,\gamma_{\mathrm{H}^+}}{\gamma_{\mathrm{SH}^+}}\right)$$

for an arbitrary reference base. The function X is called the excess acidity because it gives a measure of the difference between the acidity of a solution and that of an ideal solution of the same concentration. In practice

$$X = -(\mathrm{H}_0 + \log_{10}[\mathrm{H}^+])$$

and

$$m^* = 1 - \Phi.$$

Source:
PAC, 1994, *66*, 1077 *(Glossary of terms used in physical organic chemistry (IUPAC Recommendations 1994))* on page 1101

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