

Acid Base Indicators

Example One

Bromocresol Green is an indicator whose protonated form (HIn) is yellow and deprotonated form (In^-) is blue. The pK_a for bromocresol green is 4.90. Determine the most likely color of a solution containing bromocresol green at the following pH values:

- a. $\text{pH} = 6.90$
- b. $\text{pH} = 1.90$

Example Two

Malachite Green is an indicator whose protonated form (HIn) is yellow and deprotonated form (In^-) is bluish-green. The pK_a for malachite green is 1.30. Determine the most likely color of a solution containing malachite green at the following pH values:

- a. $\text{pH} = 0.30$
- b. $\text{pH} = 5.30$

Example Three

Bromocresol purple is an indicator whose protonated form (HIn) is yellow and deprotonated form (In^-) is violet. The pK_a for bromocresol purple is 6.40. Determine the most color of a solution containing bromocresol purple at a $\text{pH} = 4.40$.

Example Four

A titration between a weak acid and a strong base has an equivalence point at pH = 8.25. Which of the following indicators would be the best choice for this titration?

- a. Indicator A ($K_a = 1.6 \times 10^{-4}$)
- b. Indicator B ($K_a = 1.0 \times 10^{-7}$)
- c. Indicator C ($K_a = 5.7 \times 10^{-9}$)

Example Five

A titration between a weak base and a strong acid is shown below. Which of the following indicators would be the best choice for this titration?

- a. Indicator A ($K_a = 8.6 \times 10^{-2}$)
- b. Indicator B ($K_a = 1.0 \times 10^{-6}$)
- c. Indicator C ($K_a = 5.7 \times 10^{-9}$)

