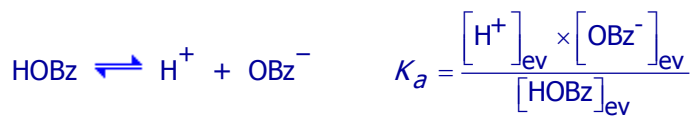


Als voor benzoëzuur  $K_a = 6,0 \cdot 10^{-5}$ , hoeveel mol benzoëzuur is er dan nodig om 500,0 mL oplossing met pH = 2,44 te maken?

### Oplossing



$$\text{pH} = 2,44 \Rightarrow [\text{H}^+] = 10^{-2,44} = 3,631 \cdot 10^{-3} \frac{\text{mol}}{\text{L}}$$

$$K_a = \frac{[\text{H}^+]_{\text{ev}} \times [\text{OBz}^-]_{\text{ev}}}{[\text{HOBz}]_{\text{ev}}} = 6,0 \cdot 10^{-5} = \frac{[\text{H}^+]_{\text{ev}}^2}{c_{\text{HOBz}} - [\text{H}^+]_{\text{ev}}}$$

### Benaderende werkwijze

Vermits HOBz een zwak zuur is, worden er relatief weinig protonen afgesplitst  $\Rightarrow [\text{H}^+]_{\text{ev}} \ll c_{\text{HOBz}}$

Dus:

$$\frac{[\text{H}^+]_{\text{ev}}^2}{c_{\text{HOBz}}} = 6,0 \cdot 10^{-5} \Rightarrow c_{\text{HOBz}} = \frac{(3,631 \cdot 10^{-3})^2}{6,0 \cdot 10^{-5}} = 0,220 \frac{\text{mol}}{\text{L}}$$

Om 500 mL oplossing te maken is er dus **0,110 mol HOBz** nodig.

### Exacte werkwijze

$$\frac{[\text{H}^+]_{\text{ev}}^2}{c_{\text{HOBz}} - [\text{H}^+]_{\text{ev}}} = 6,0 \cdot 10^{-5} \Rightarrow c_{\text{HOBz}} = \frac{[\text{H}^+]_{\text{ev}}^2 + 6,0 \cdot 10^{-5} \times [\text{H}^+]_{\text{ev}}}{6,0 \cdot 10^{-5}}$$

$$c_{\text{HOBz}} = \frac{(3,631 \cdot 10^{-3})^2 + 6,0 \cdot 10^{-5} \times 3,631 \cdot 10^{-3}}{6,0 \cdot 10^{-5}} = 0,223 \frac{\text{mol}}{\text{L}}$$

Om 500 mL oplossing te maken is er dus **0,112 mol HOBz** nodig.