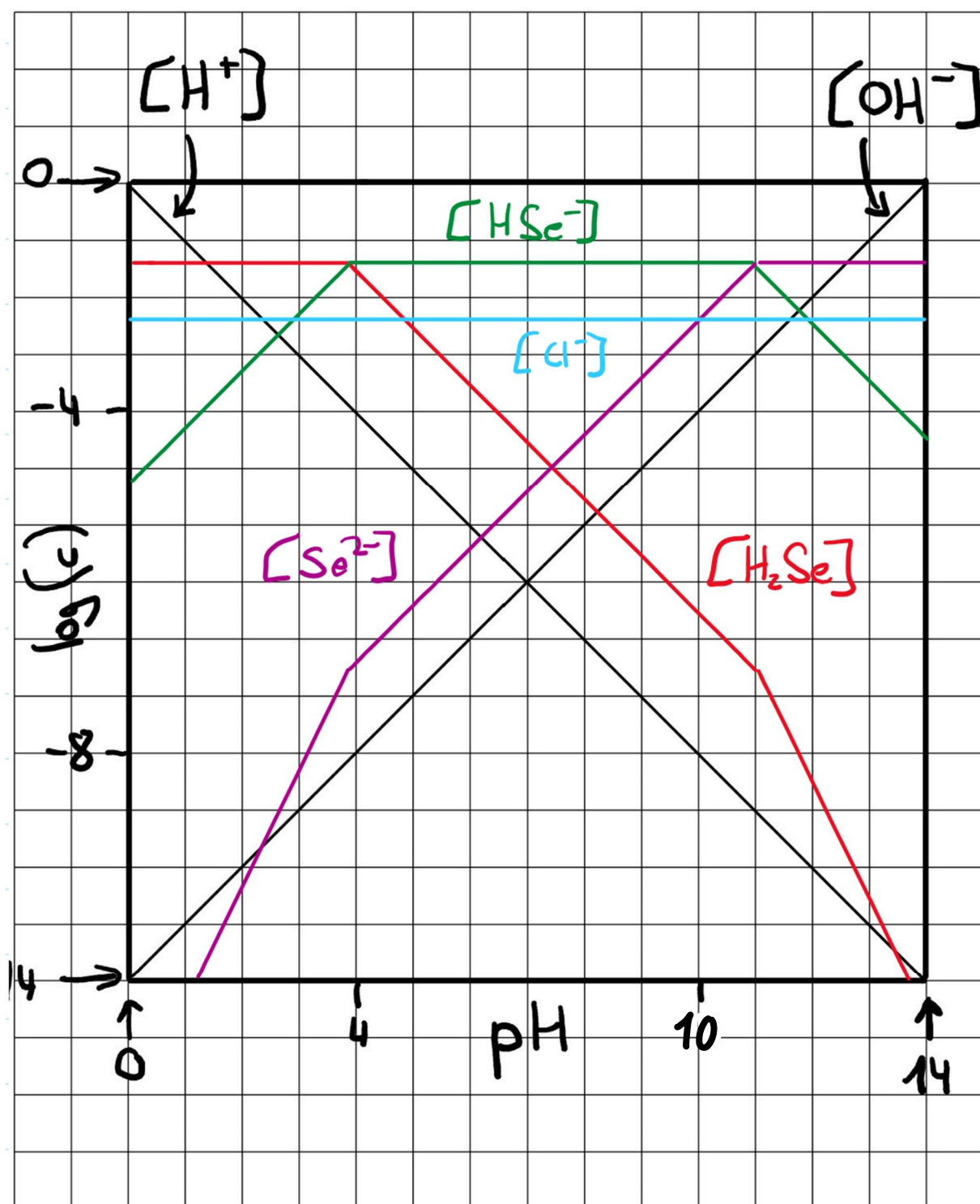




Protonenherkunftsgleichung

$+H^+$	verwendete Teilchen	$-H^+$
H_2Se	HSe^-	Se^{2-}
$\underline{\quad}$	HCl	Cl^-
H_3O^+	H_2O	OH^-

$$[H^+] + [H_2Se] = [Se^{2-}] + [Cl^-] + [OH^-]$$

$$pK_{a1}(H_2Se / HSe^-) = 3,89$$

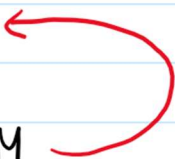
$$pK_{a2}(HSe^- / Se^{2-}) = 11$$

$$c(HSe^-) = \frac{0,05 \text{ mol}}{L} \longrightarrow \log\left(\frac{c(HSe^-)}{c^\circ}\right) = -1,3$$

$$c(HCl) = 0,005 \text{ M} \longrightarrow \log\left(\frac{c(HCl)}{c^\circ}\right) = -2,3$$

$$pH = 4,9$$

$$c(Se^{2-}) \text{ bei diesem } pH = 4 \cdot 10^{-8} \text{ M}$$

$$\log(c(Se^{2-})) = -7,4 \rightarrow c(Se^{2-}) = 10^{-7,4} \text{ M}$$


Berechnung pH

- $\text{HCl} \rightarrow \text{Cl}^- + \text{H}^+$
- $\text{HSe}^- + \text{H}^+ \rightarrow \text{H}_2\text{Se}$

$$n(\text{HSe}^-) = n_0(\text{HSe}^-) - n(\text{HCl}) = 0,005\text{mol} - 0,0005\text{mol}$$

$$n(\text{H}_2\text{Se}) = n_0(\text{H}_2\text{Se}) + n(\text{HCl}) = 0 + 0,0005\text{mol}$$

$$\rightarrow n(\text{HSe}^-) = 0,0045\text{mol}$$

$$\rightarrow n(\text{H}_2\text{Se}) = 0,0005\text{mol}$$

$$\rightarrow \text{pH} = \text{pH}_A + \lg \frac{n(\text{HSe}^-)}{n(\text{H}_2\text{Se})} = 3,89 + \lg \frac{0,0045}{0,0005} = 4,84$$