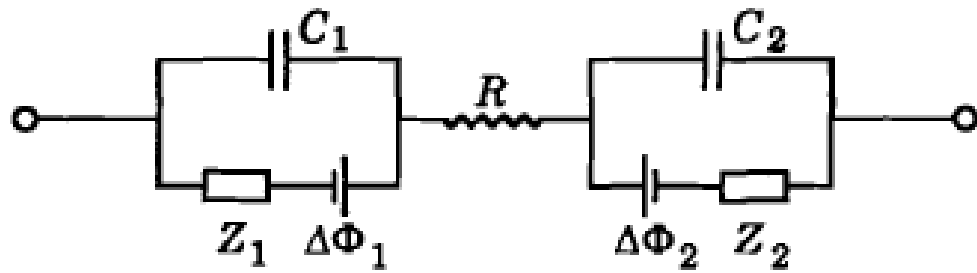
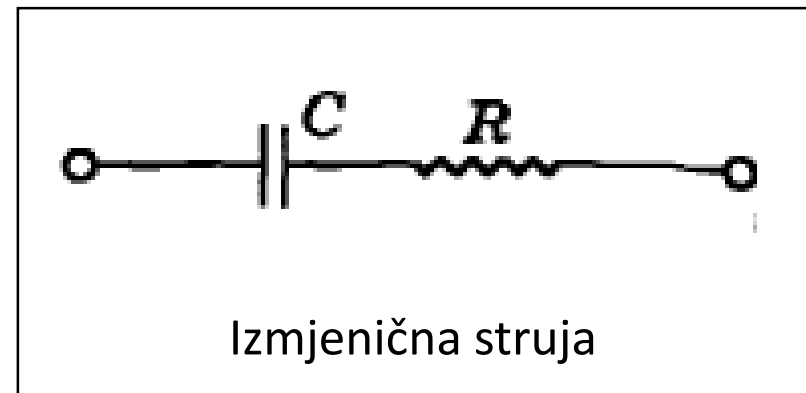


# Provodnost elektrolitnih otopina

# Kako mjeriti otpor elektrolitne otopine?



Istosmjerna struja



Izmjenična struja

# Osnovne veličine

- Vodljivost ( $G / S$ )
- Provodnost ( $\kappa / S \text{ cm}^{-1}$ )
- Molarna provodnost ( $\Lambda / S \text{ cm}^2 \text{ mol}^{-1}$ )
- Pokretljivost iona ( $u$ )

# Ovisnost molarne provodnosti o sastavu otopine

- Kohlrauschov zakon

$$\Lambda = \Lambda^0 - b\sqrt{c}$$

- Debye-Huckel-Onsagerova teorija

$$\Lambda = \Lambda^0 - \frac{|z_1 z_2| \Lambda^0}{12 \pi \epsilon x_A R T N_A} - \frac{q}{1 + \sqrt{q}} - \frac{(|z_1| + |z_2|) F^2}{6 \pi \eta N_A x_A}$$

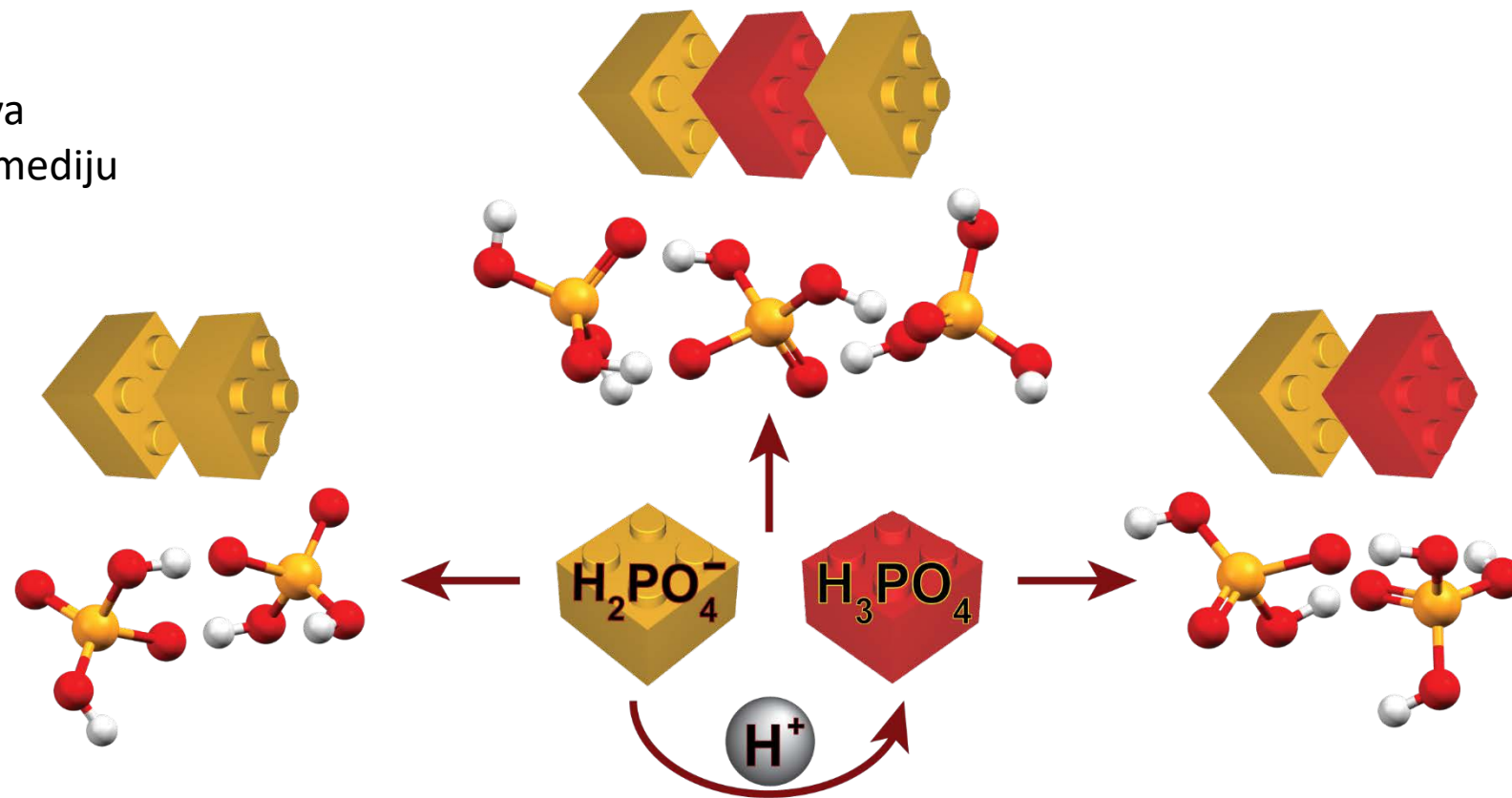
$$q = \frac{z_1 z_2}{(z_1 - z_2)(z_2 t_1 - z_1 t_2)}$$



$$\Lambda = \Lambda^0 - (\Lambda^0 A + B)\sqrt{c}$$

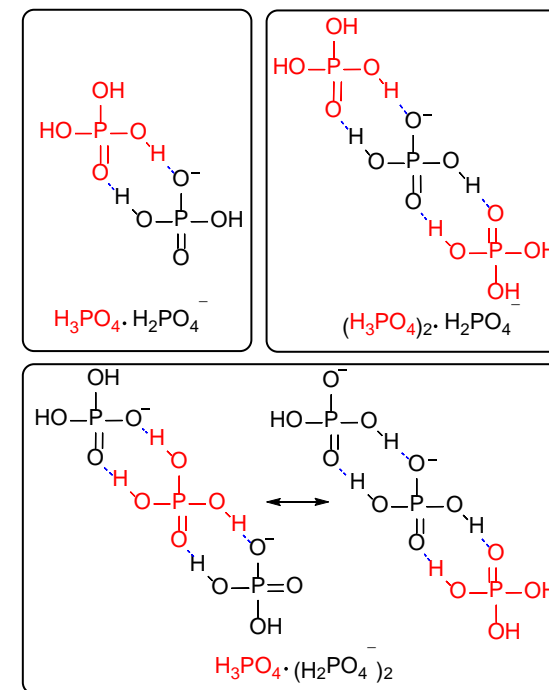
# Primjena konduktometrijskih mjerenja u fizikalnoj i analitičkoj kemiji

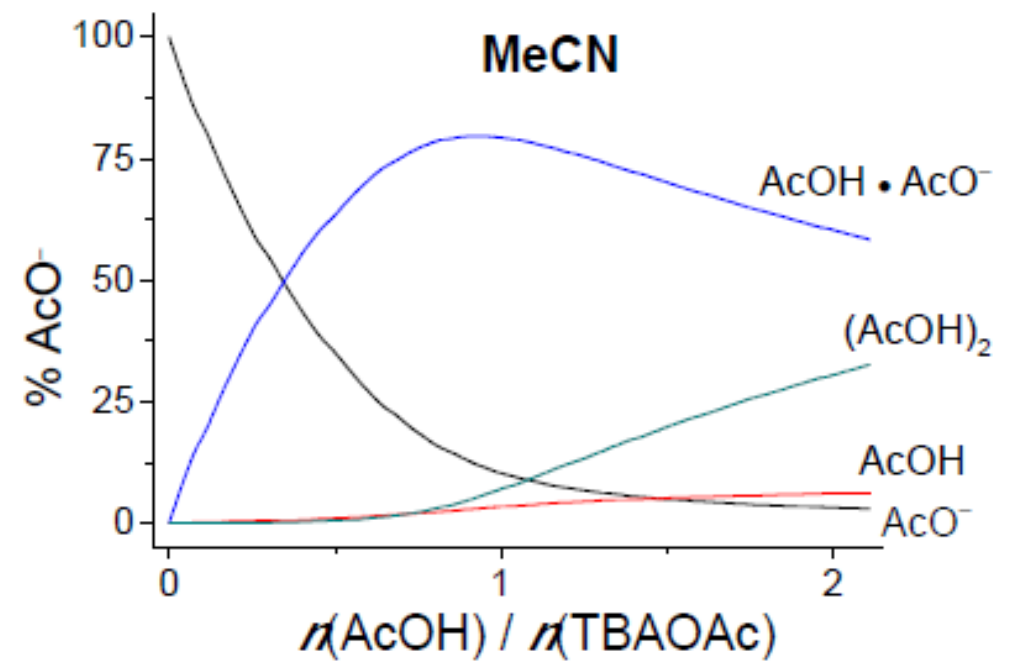
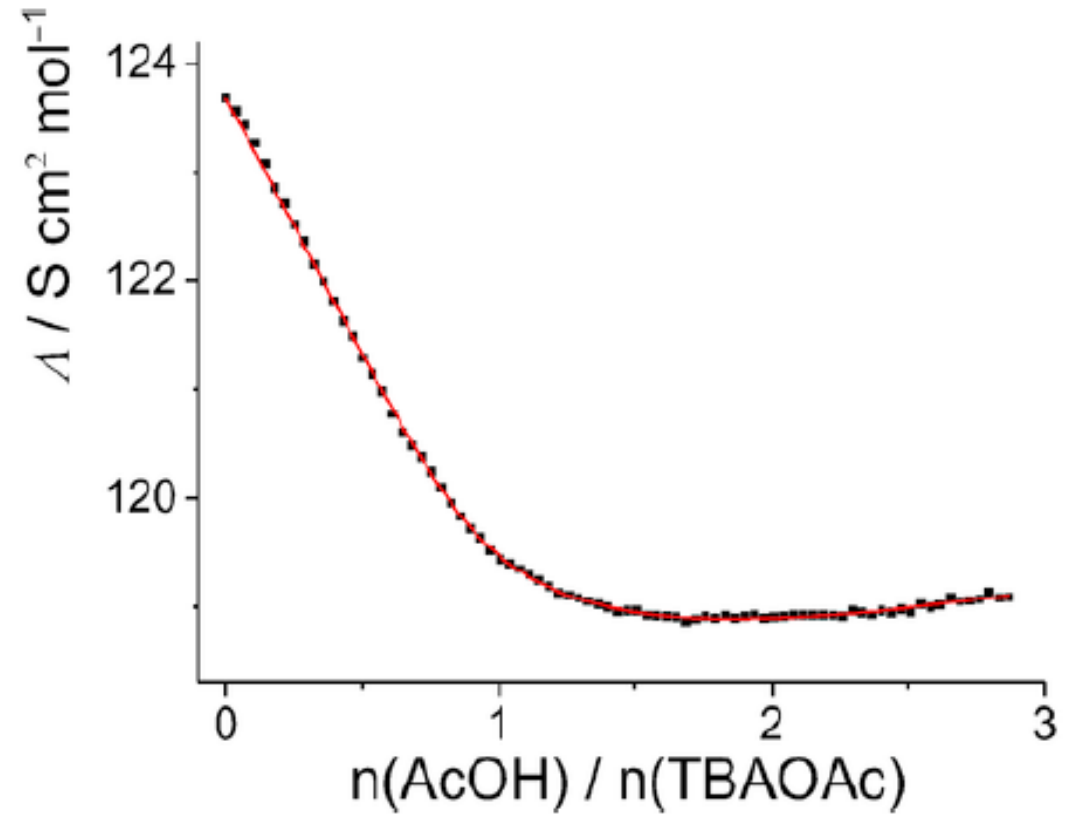
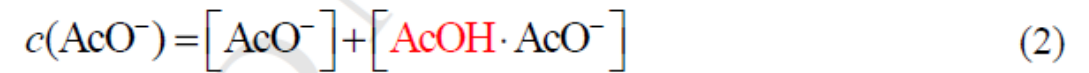
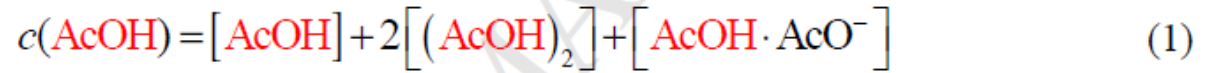
Primjer: kiselinsko-bazna svojstva fosforne kiseline u nevodenom mediju



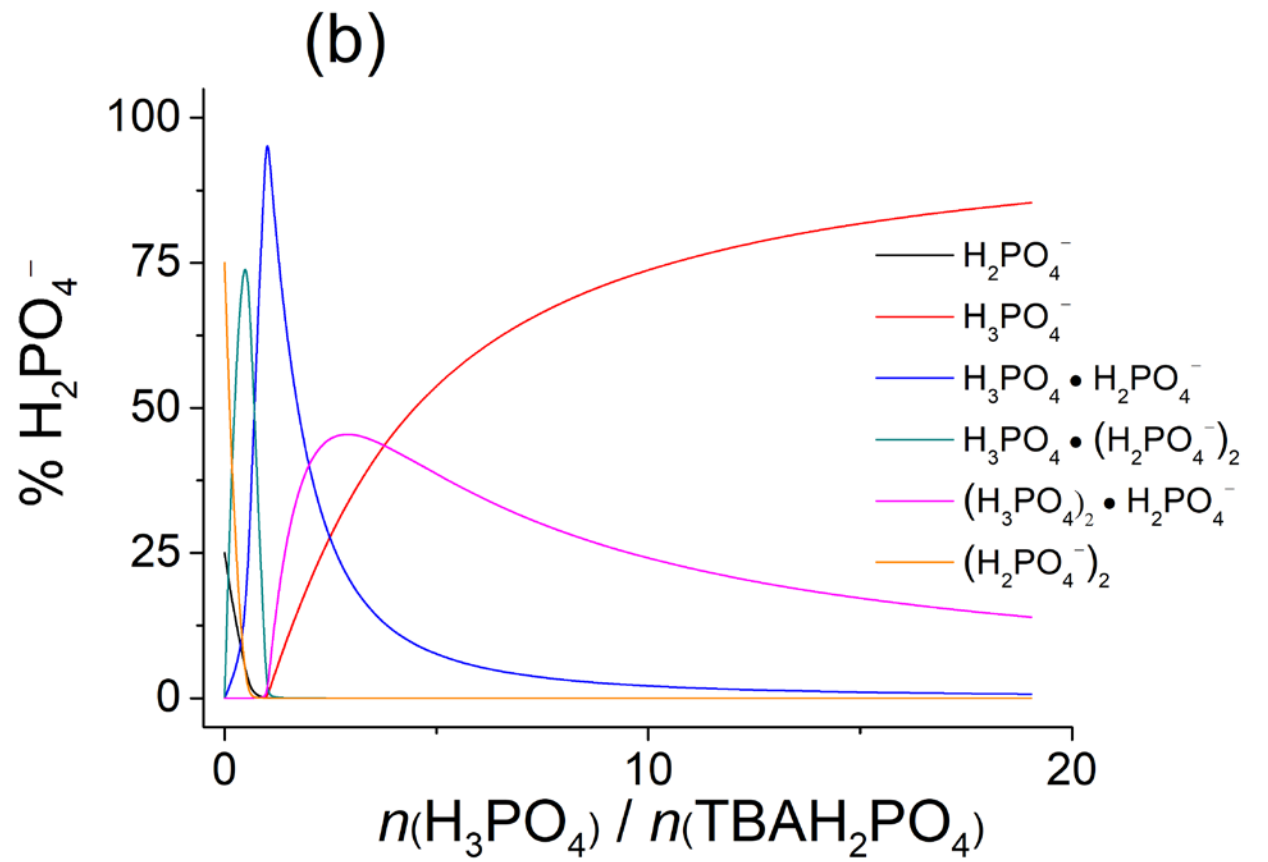
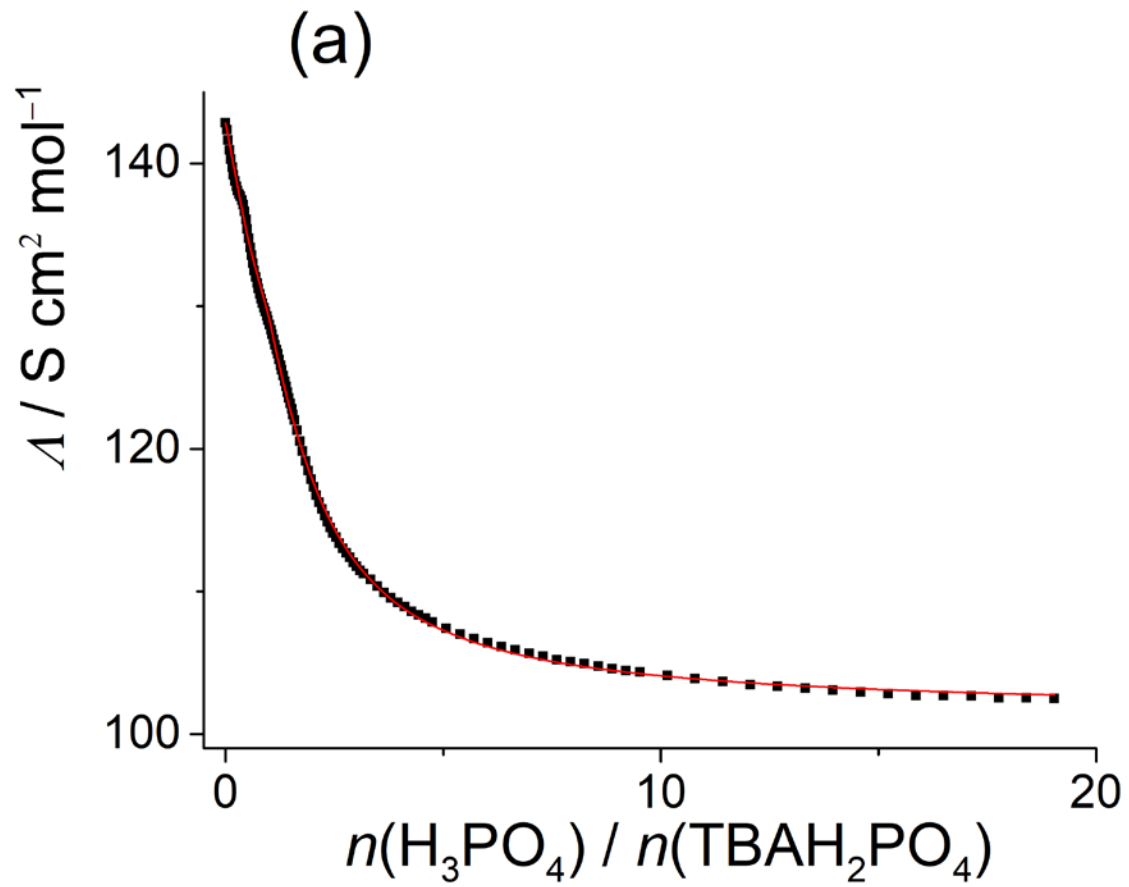
Kvantitativni opis složenog sustava ravnoteža postignut je korištenjem brojnih tehnika uključujući konduktometriju

REACTION	Equilibrium constant
$\text{H}_2\text{PO}_4^- + \text{H}^+ \rightleftharpoons \text{H}_3\text{PO}_4$	$K^{\text{H}} = \frac{[\text{H}_3\text{PO}_4]}{[\text{H}_2\text{PO}_4^-][\text{H}^+]}$
$2\text{H}_2\text{PO}_4^- \rightleftharpoons (\text{H}_2\text{PO}_4^-)_2$	$K_{0,2} = \frac{[(\text{H}_2\text{PO}_4^-)_2]}{[\text{H}_2\text{PO}_4^-]^2}$
$\text{H}_3\text{PO}_4 + \text{H}_2\text{PO}_4^- \rightleftharpoons \text{H}_3\text{PO}_4 \cdot \text{H}_2\text{PO}_4^-$	$K_{1,1} = \frac{[\text{H}_3\text{PO}_4 \cdot \text{H}_2\text{PO}_4^-]}{[\text{H}_3\text{PO}_4][\text{H}_2\text{PO}_4^-]}$
$\text{H}_3\text{PO}_4 \cdot \text{H}_2\text{PO}_4^- + \text{H}_2\text{PO}_4^- \rightleftharpoons \text{H}_3\text{PO}_4 \cdot (\text{H}_2\text{PO}_4^-)_2$	$K_{1,2} = \frac{[\text{H}_3\text{PO}_4 \cdot (\text{H}_2\text{PO}_4^-)_2]}{[\text{H}_3\text{PO}_4 \cdot \text{H}_2\text{PO}_4^-][\text{H}_2\text{PO}_4^-]}$
$\text{H}_3\text{PO}_4 + \text{H}_3\text{PO}_4 \cdot \text{H}_2\text{PO}_4^- \rightleftharpoons (\text{H}_3\text{PO}_4)_2 \cdot \text{H}_2\text{PO}_4^-$	$K_{2,1} = \frac{[(\text{H}_3\text{PO}_4)_2 \cdot \text{H}_2\text{PO}_4^-]}{[\text{H}_3\text{PO}_4][\text{H}_3\text{PO}_4 \cdot \text{H}_2\text{PO}_4^-]}$





Konduktometrijska titracija tetrabutilamonijevog acetata s octenom kiselinom u acetonitrilu.



Konduktometrijska titracija tetrabutilamonijevog fosfata s fosfornom kiselinom u acetonitrilu.