

Električne lastnosti

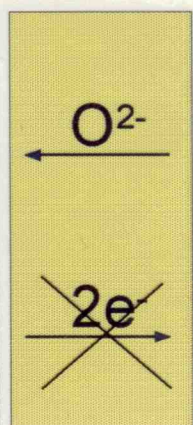


O₂ senzor

Neznani parcialni tlak

p_1

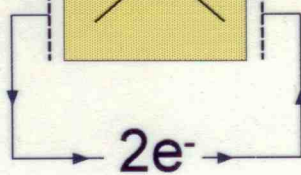
O₂



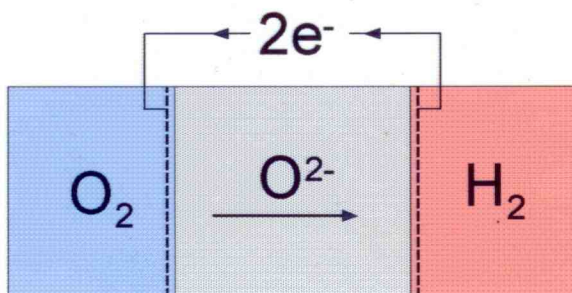
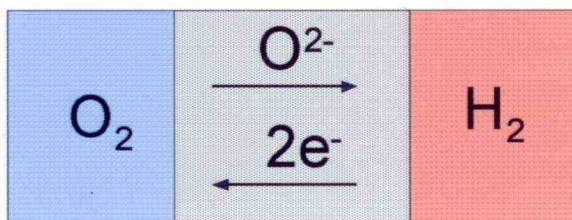
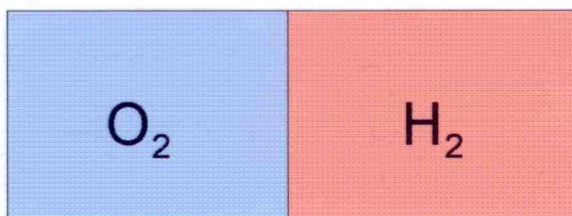
Referenčni parcialni tlak

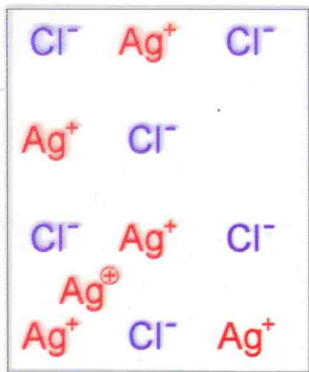
$p_2 > p_1$

O₂

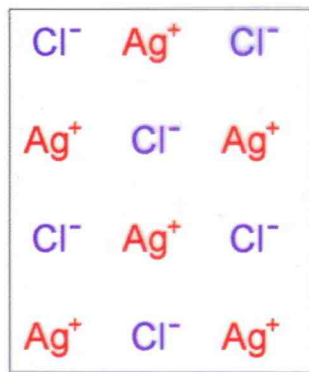


Gorivna celica

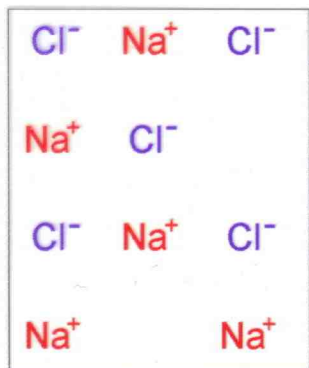
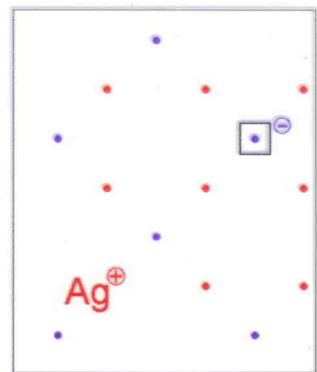




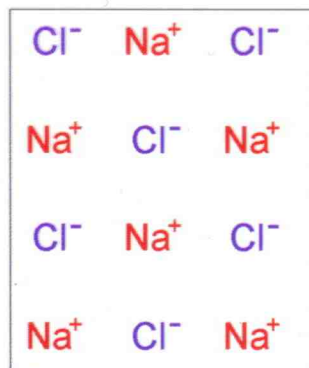
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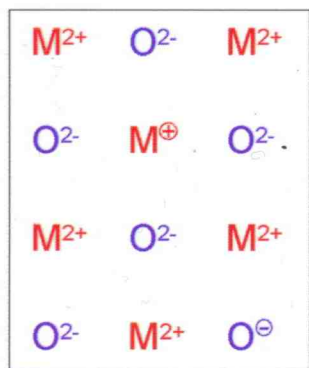
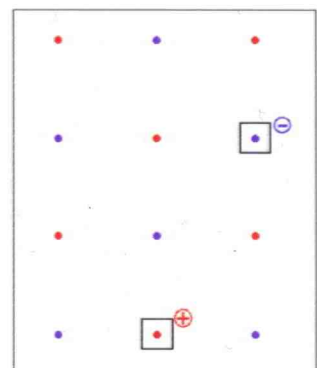
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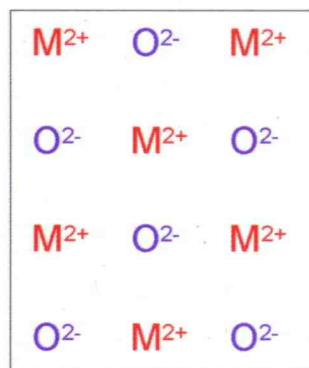
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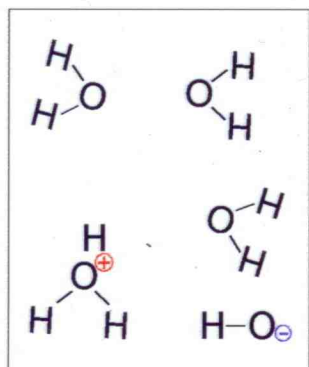
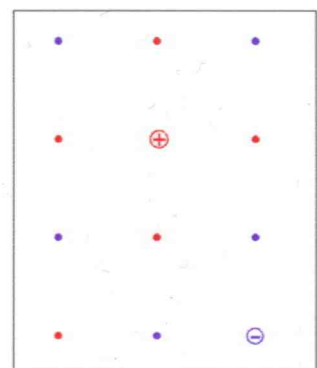
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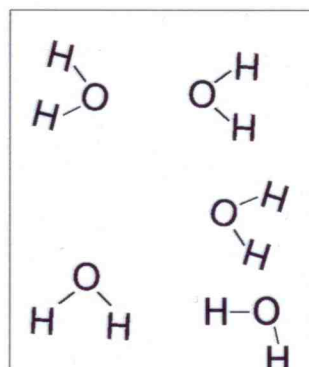
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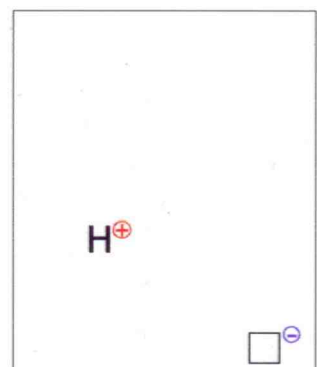
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N - meričnik mest
 n - točkasti le napaki $n = ? \quad \frac{\partial G}{\partial n} = 0$

$$dG = -SdT + VdP + \sum_j \mu_j dn_j + \frac{1}{2} \phi dq$$

$$G = U - TS + PV$$

$$= F + PV$$

$$= F_0 - TS_{\text{config}} + P(V_{\text{ideal}} + nV_{\text{defect}})$$

$$H = \frac{1}{2} \sum_{\vec{k}, \vec{k}'} \phi(\vec{k} - \vec{k}') + \sum_{\vec{k}} \frac{p^2(\vec{k})}{2m} + \frac{1}{4} \sum_{\vec{k}, \vec{k}'} (\vec{u}(\vec{k}) - \vec{u}(\vec{k}')) \cdot \nabla^2 \phi(\vec{k} + \vec{u}(\vec{k}) - \vec{k}' - \vec{u}(\vec{k}'))$$

$$e^{-\frac{F_0}{kT}} = \sum_i e^{-\frac{E_i}{kT}} ; \quad E_i = U_{\text{eq}} + E_i^{\text{ph}}$$

$$F_0 = U_{\text{eq}} + F^{\text{ph}}$$

$$\sum_i e^{-\frac{E_i^{\text{ph}}}{kT}} = e^{-\frac{F^{\text{ph}}}{kT}}$$

$$\frac{\partial F_0}{\partial n} \approx \frac{\partial U_{\text{eq}}}{\partial n} = \varepsilon$$

$$S_{\text{config}} = k \ln \frac{N(N-1) \dots (N-n+1)}{n!} = k \ln \frac{N!}{n!(N-n)!} \quad \ln N! = N \ln(N-1)$$

$$= k \ln C_N^n = k \ln \binom{N}{n}$$

$$\approx k \{ N \ln(N-1) - n \ln(n-1) - (N-n) \ln(N-n-1) \}$$

$$\frac{\partial S_{\text{config}}}{\partial n} = k \left\{ -\ln(n-1) - \frac{n}{n-1} + \ln(N-n-1) + \frac{(N-n)}{N-n-1} \right\} \quad N \gg n \gg 1$$

$$\approx k \left\{ \ln \frac{N-n-1}{n-1} \right\} \approx k \ln \frac{N}{n}$$

$$\frac{\partial G}{\partial n} = \varepsilon - kT \ln \frac{N}{n} + P V_{\text{defect}} = 0 \quad n = N e^{-\frac{\varepsilon + P V_{\text{defect}}}{kT}}$$

$$v_0 = 10^{-20} \text{ m}^3$$

$$P_0 v_0 = 10^{-6} \text{ eV}$$

$$\sum_j g_j n_j = 0$$

$$\frac{\partial}{\partial n} (G + \lambda \sum_j g_j n_j) = 0$$

$$n_1 = N e^{-\frac{\varepsilon_1 + e\lambda}{kT}}$$

$$\varepsilon_1 + e\lambda = \varepsilon_2 - e\lambda$$

$$n_2 = N e^{-\frac{\varepsilon_2 - e\lambda}{kT}}$$

$$e\lambda = \frac{\varepsilon_2 - \varepsilon_1}{2}$$

$$n_c(T) = \int_{\varepsilon_c}^{\infty} g_c(\varepsilon) \frac{1}{e^{\frac{\varepsilon - \mu}{kT}} + 1} d\varepsilon$$

$$n_1 n_2 = N^2 e^{-\frac{\varepsilon_1 + \varepsilon_2}{kT}}$$

$$= N_c e^{-\frac{\varepsilon_c - \mu}{kT}}$$

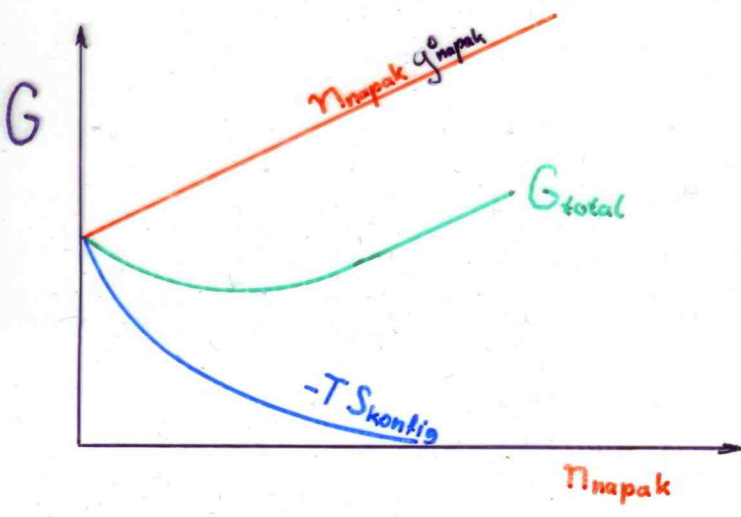
$$N_c = \int_{\varepsilon_c}^{\infty} g_c(\varepsilon) e^{-\frac{(\varepsilon - \varepsilon_c)}{kT}} d\varepsilon$$

$$\mu = \frac{1}{2\pi} \sqrt{\frac{K}{m}} e^{-\frac{qV}{kT}} \cdot \frac{1}{6} \beta^2 \approx \frac{1}{2T} \left[\frac{km^2}{v_0} \right]$$

$$\int_0^{\infty} e^{-ax^2} dx = \frac{1}{2} \sqrt{\frac{\pi}{a}}$$

$$\int_0^{\infty} x e^{-ax^2} dx = \frac{1}{2a}$$

$$G(n_{\text{napak}}) = G_{\text{ideal}} + n_{\text{napak}} g_{\text{napak}} - k_B T \ln \left(\frac{N_{\text{razpoložljivih mest}}}{n_{\text{napak}}} \right)$$

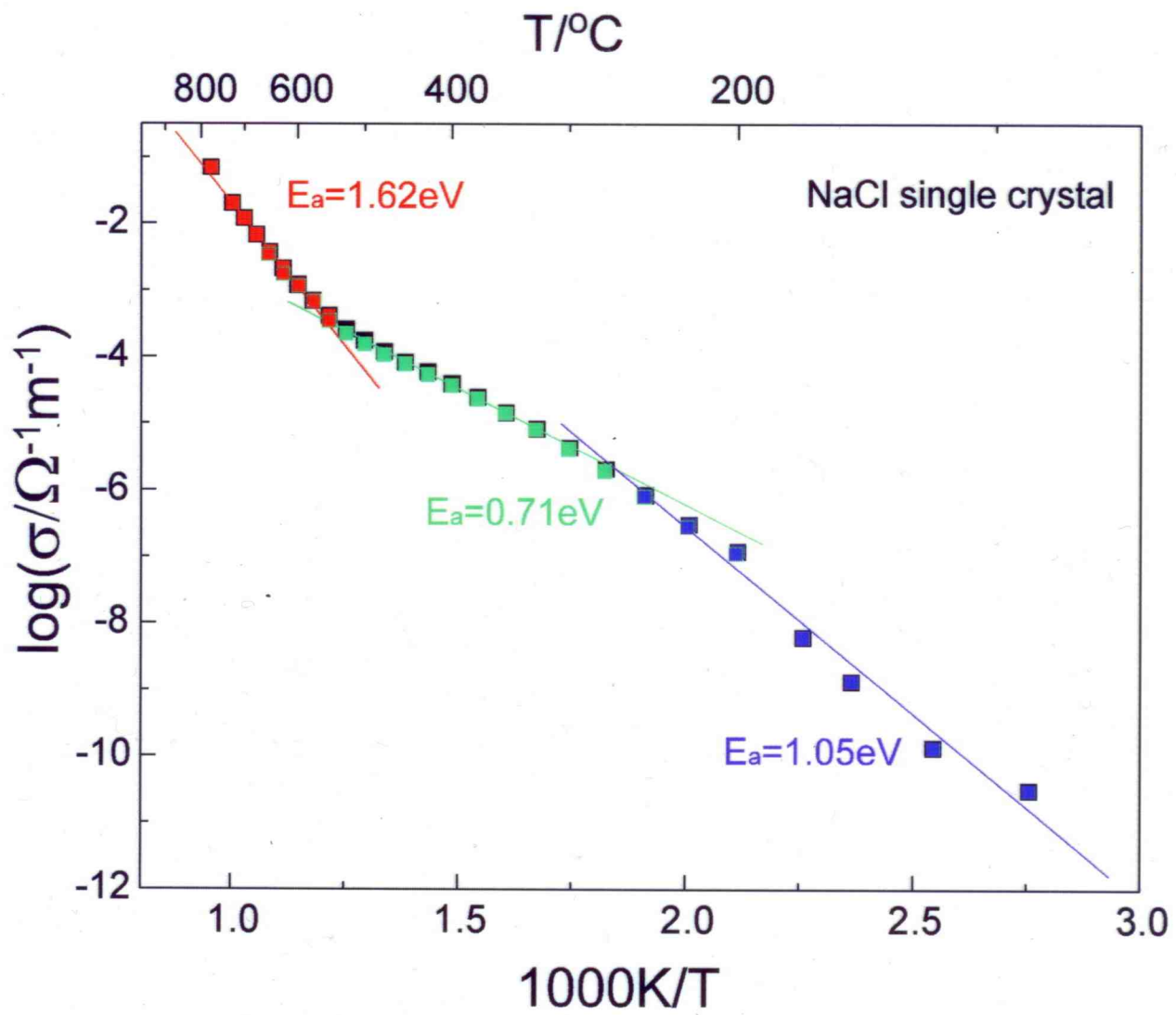


Loto 

KUPON D

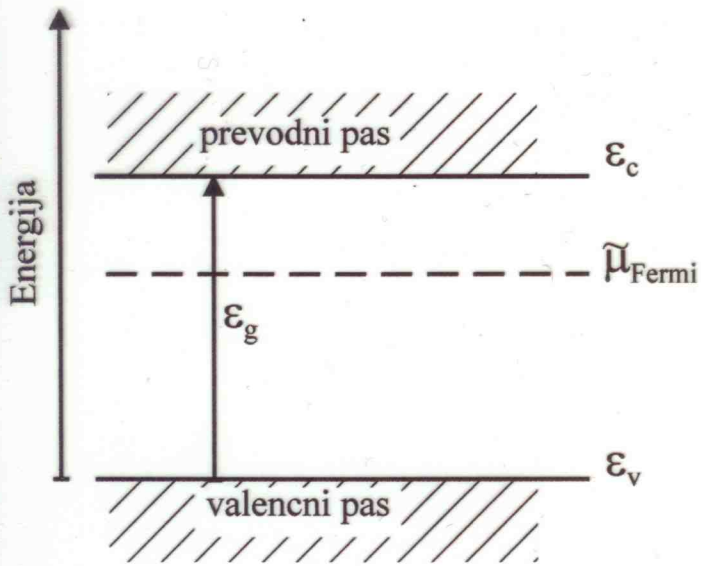
SISTEM		
1	2	3
4	5	X
X	8	9
10	11	12
13	14	X
16	17	18
19	X	21
22	23	24
25	26	27
X	29	30
31	32	X
34	35	36
X	38	39





Arrhen. plot for NaCl single crystal

Polprevodniki



Ionski prevodniki



$$\tilde{\mu}_+ = \frac{1}{2}(\epsilon_+ - \epsilon_-) + \frac{1}{2} kT \ln \frac{n_+ N_-}{n_- N_+}$$