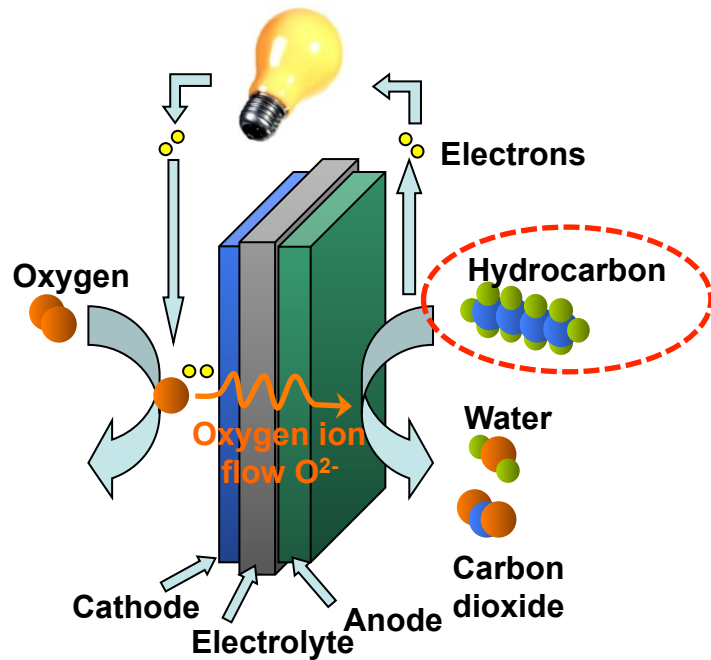


SOFC tip gorivnih celic



Izzivi za SOFC materiale:

Zvišanje ionske prevodnosti (elektrolit)

Možnost uporabe ogljikovodikov (anodni material)

minimizacija odlaganja C

tolerantnost na S

Kosintranje večslojnega sistema

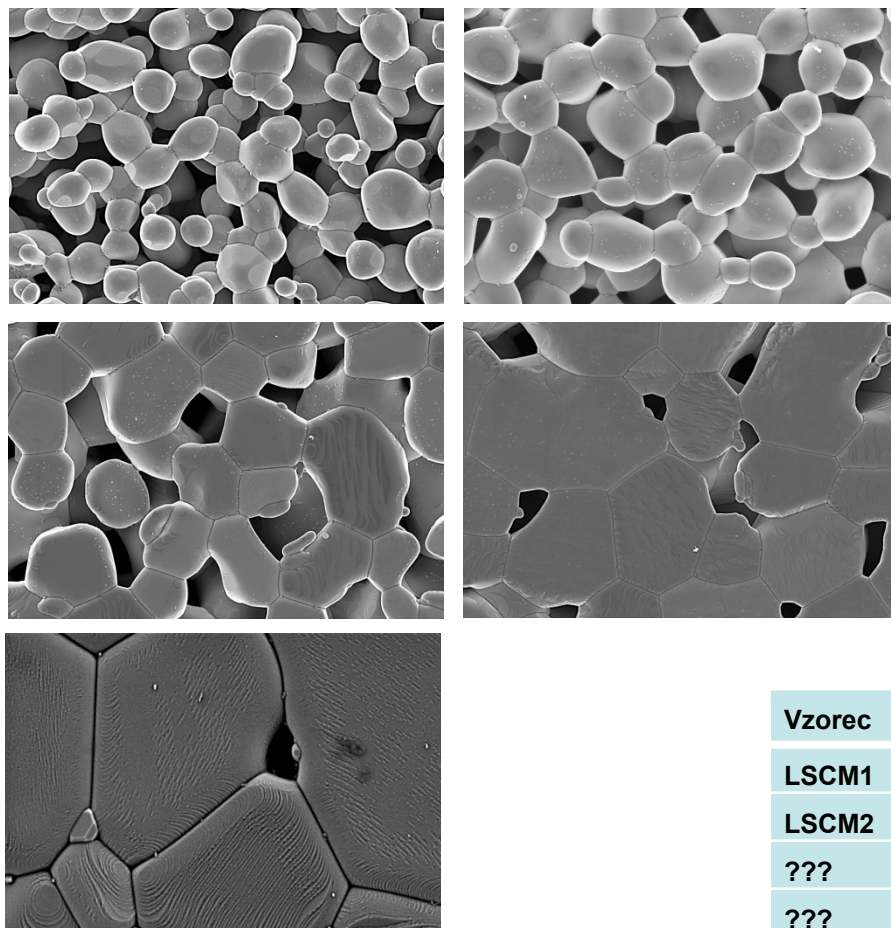
fundamentalni študiji sintranja

(La_{0.75}Sr_{0.25})_{0.9}Cr_{0.5}Mn_{0.5}O₃ (LSCM):

- Comparable performance with Ni-YSZ in H₂S free gas
- Sulphur tolerance decreases as Mn content is increased (MnS and La₂O₂S formation), opposite trend for anode performance

Sinteza in sintranje LSCM

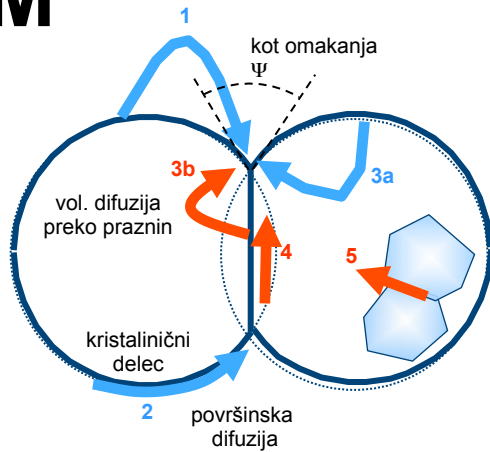
- Sinteza različnih sestav LSCM
- Opis sintranja različnih LSCM



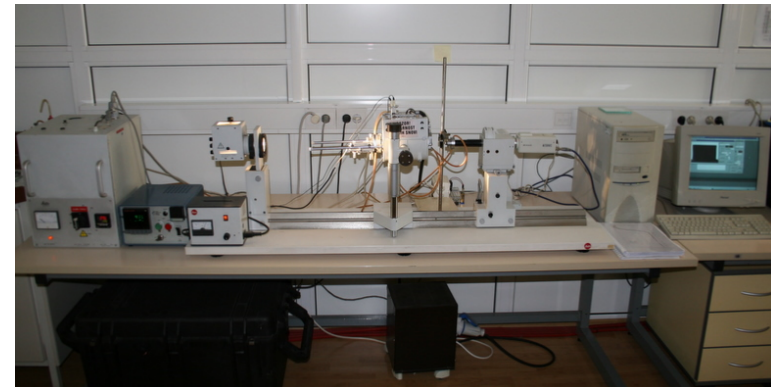
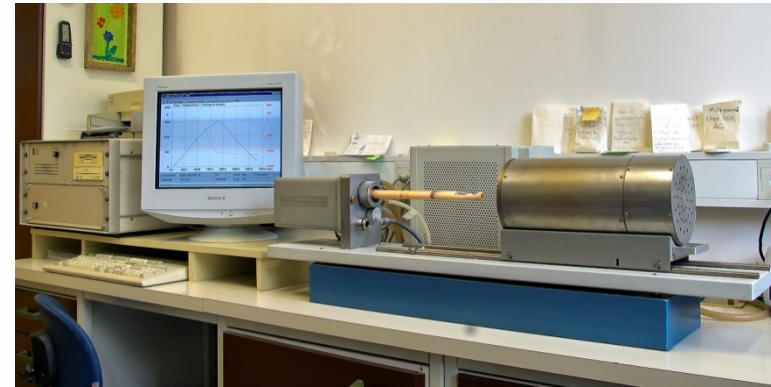
Vzorec	$T_s / ^\circ\text{C}$	$\rho_{\text{rel.s.}} / \%$	$\epsilon / \%$	$\bar{d} / \mu\text{m}$	Ψ	$d_x / \mu\text{m}$	$d_y / \mu\text{m}$
LSCM1	1200	49,067	50,933	0,500	0,746	0,569	0,552
LSCM2	1300	60,245	39,755	0,887	0,830	0,960	0,956
???	???	76,581	23,419	1,379	0,784	1,526	1,503
???	???	90,455	9,545	1,612	0,804	1,763	1,767

- Opis mikrostrukture sintranega LSCM

Kinetika sintranja LSCM



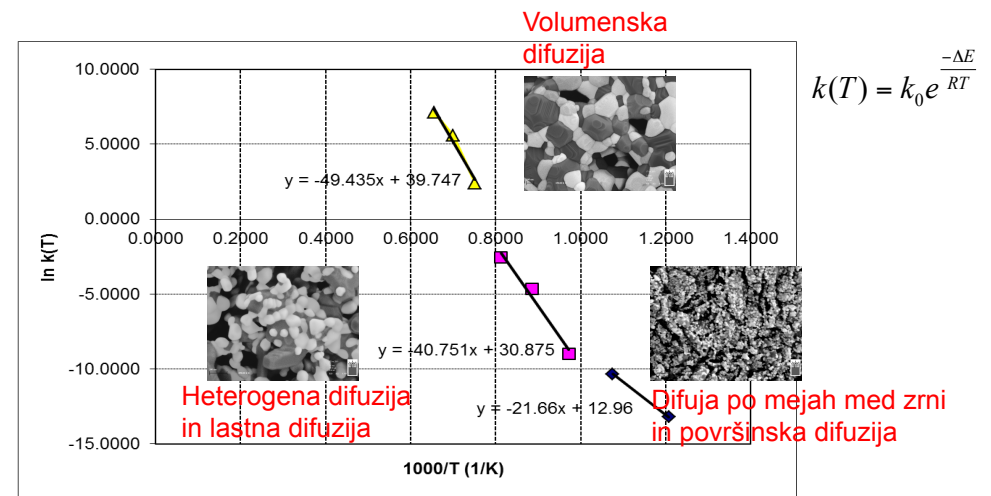
1. transport skozi zunanjo parno fazo
2. površinska difuzija
3. volumenska difuzija
4. difuzija po mejah med zrni
5. viskozni tok:



Makipirtti-Meng modelna enačba sintranja:

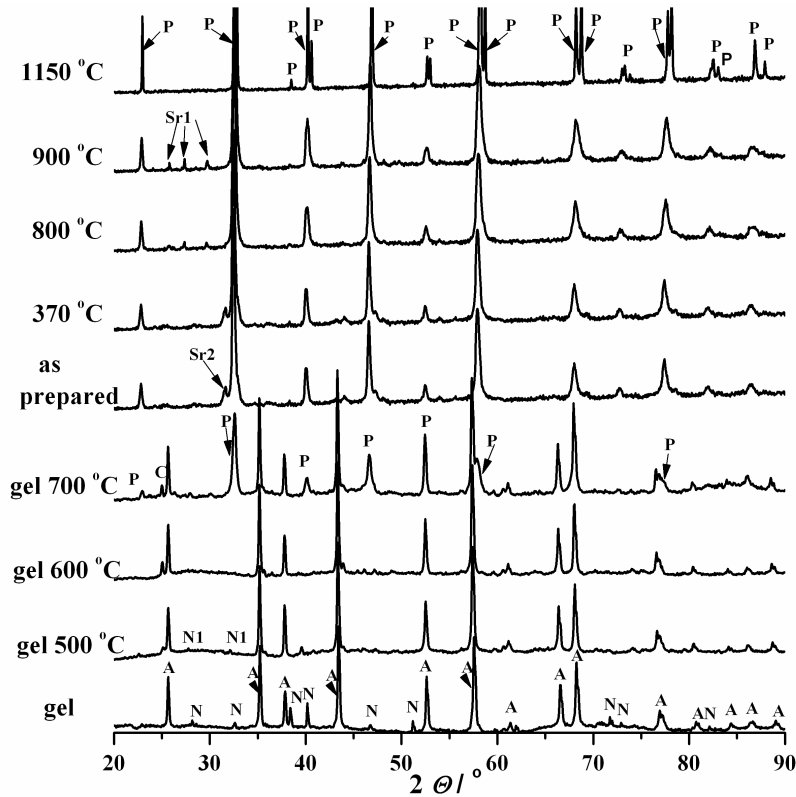
$$\frac{dY}{dt} = nk(T)Y(1-Y)\left(\frac{1-Y}{Y}\right)^{\frac{1}{n}}$$

- Stopenjsko sintranje različnih sestav LSCM
- Računska obdelava podatkov

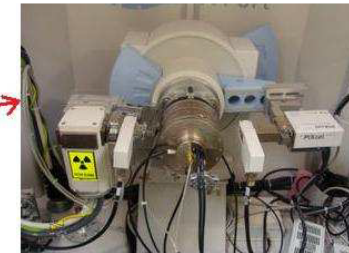


Kristalografske lastnosti LSCM

- XDR analiza različnih LSCM
- Snemanje visokotemperaturnih XRD spektrov



P- perovskite
A- corundum
N- $\text{Sr}(\text{NO}_3)_2$
N₁- SrN_xO_z
C- carbon
Sr₁- Sr_2CrO_4
Sr₂- SrCrO_4

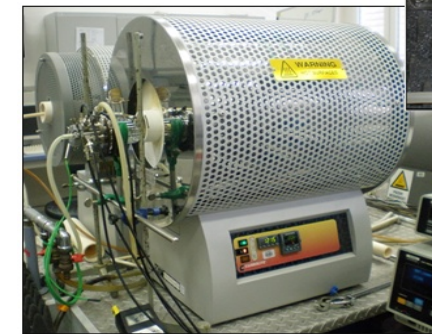
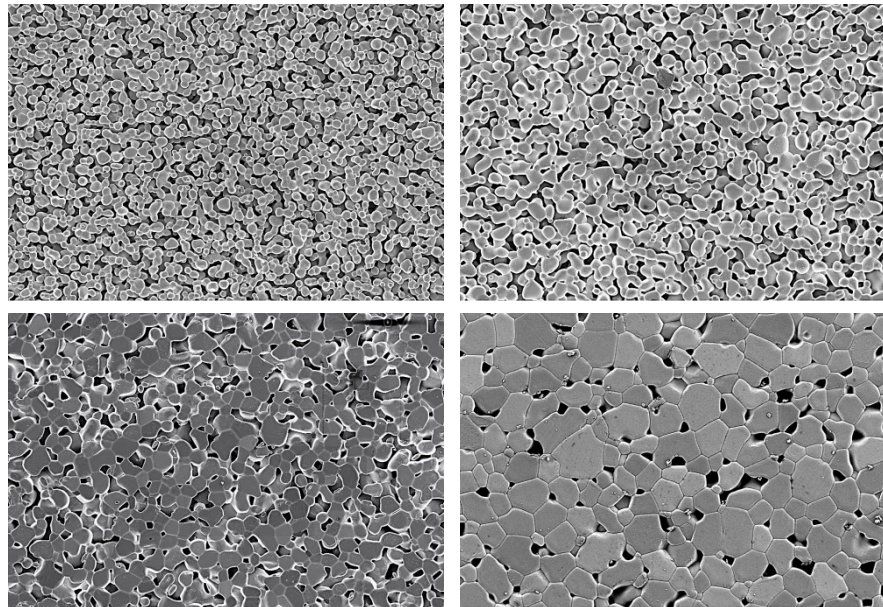
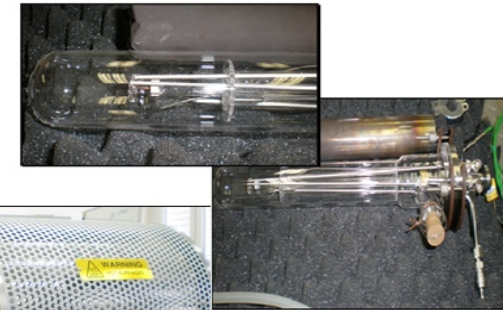
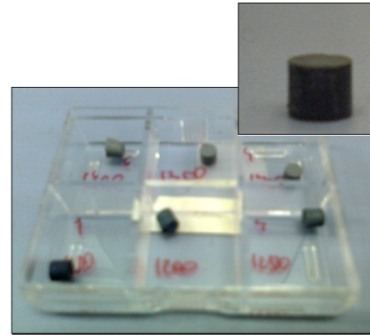


Vzorec	a (Å)	C (Å)	V (Å ³)	ρ (g/cm ³)
LSCM1	5,498	13,319	348,668	6,502
LSCM2	5,508	13,327	350,122	6,548
LSCM3	???	13,319	348,152	6,493
???	???	???	???	????

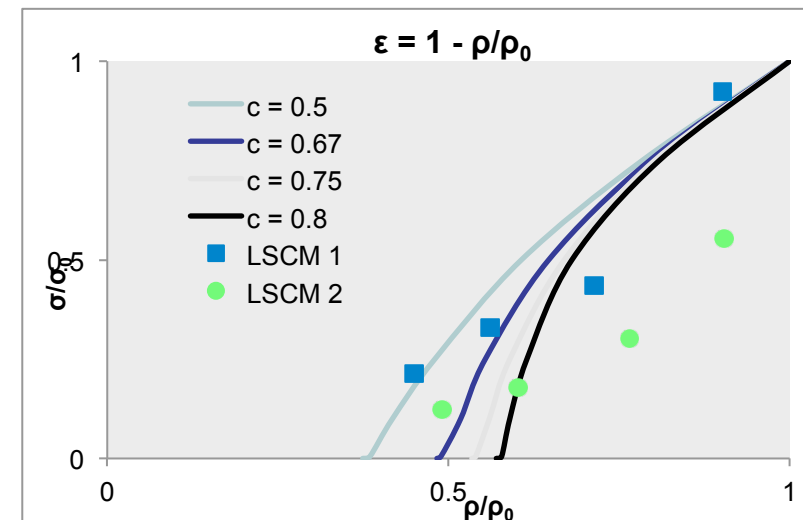
- Opis razvoja faz
- Obdelava podatkov in kristalografski izračuni

Električne lastnosti LSCM

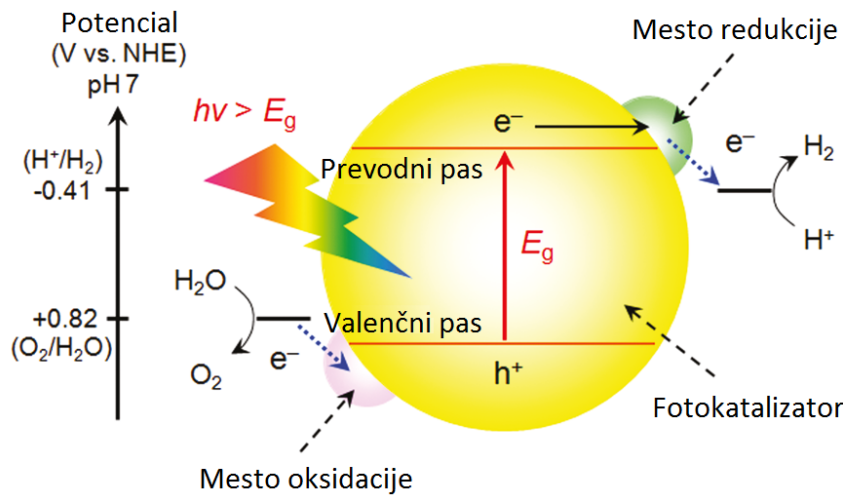
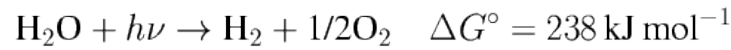
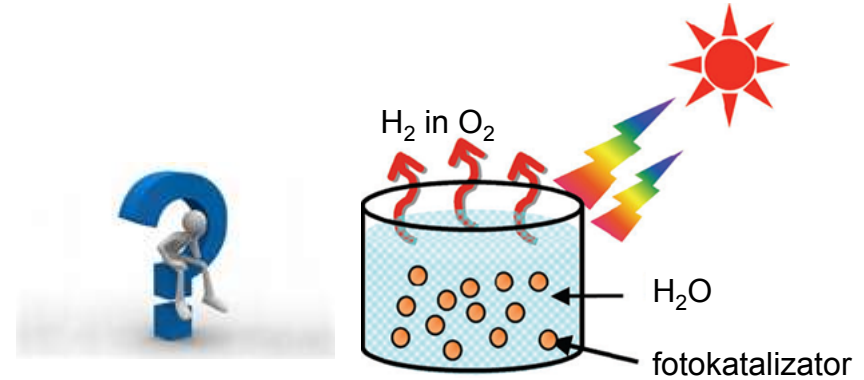
- Priprava tablet LSCM
- Sintranje LSCM pri različnih pogojih
- Opis mikrostrukture



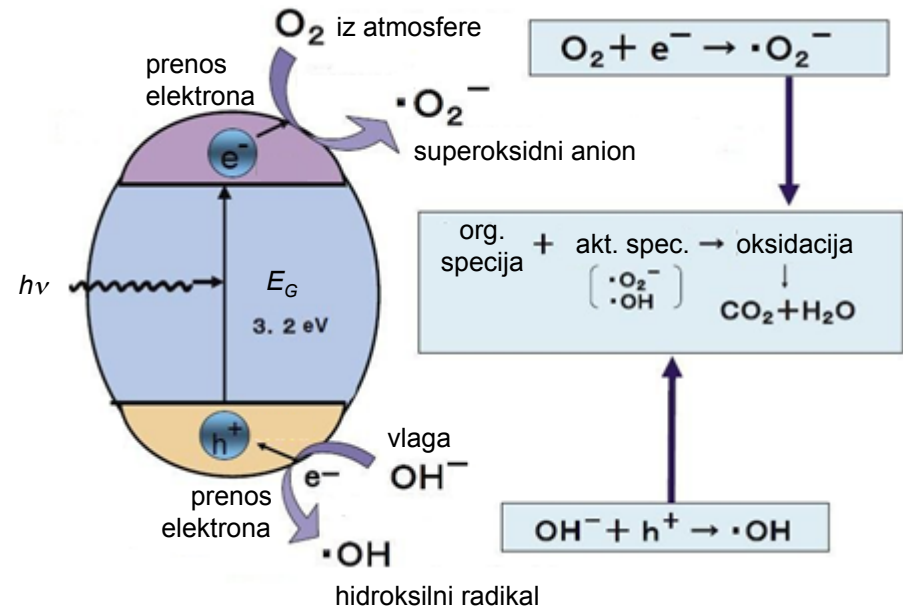
- Merjenje električne upornosti sintranega LSCM
- Obdelava podatkov



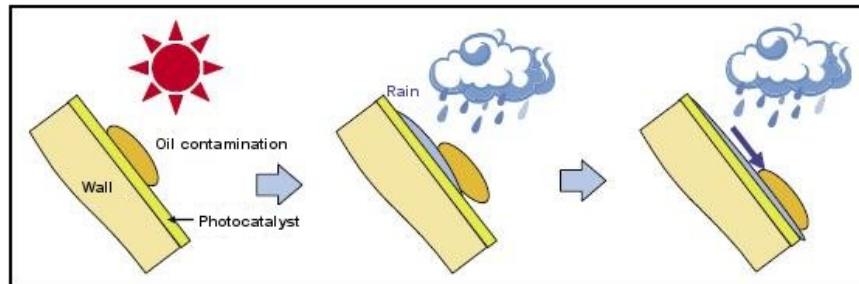
Fotokatalizatorji



Glavni izziv: Primeren fotokatalizator



Breztokovni razklop vode

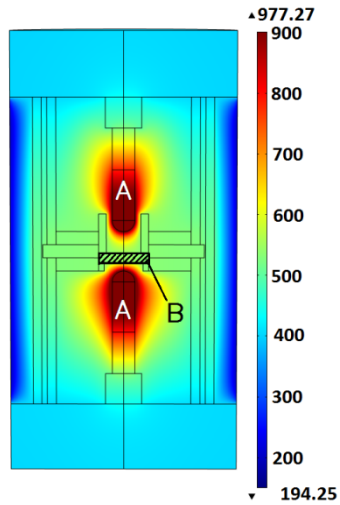


Samočistilni premazi

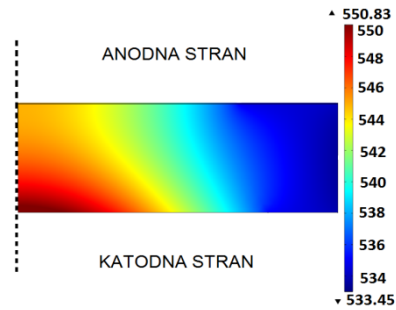
Oksidacija organskih polutantov

- Določevanje fotokatalitske aktivnosti različnih TiO₂ katalizatorjev

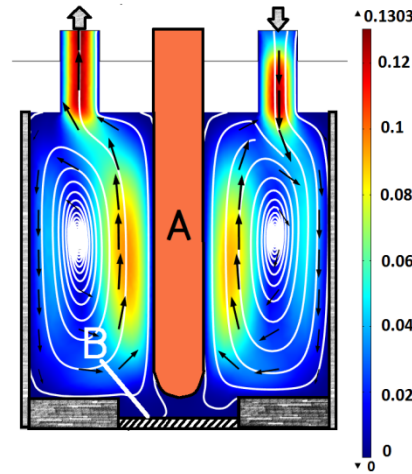
Modeliranje



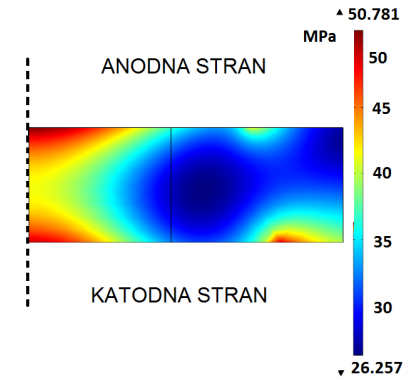
Porazdelitev T v testni celici



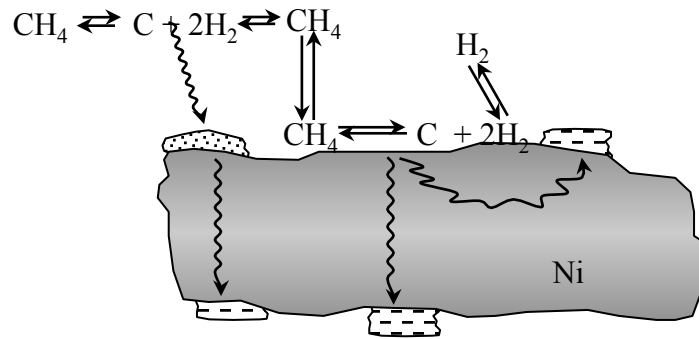
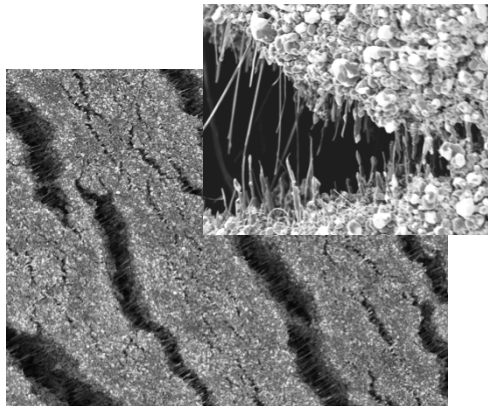
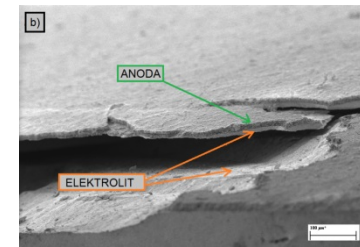
Porazdelitev T V testni membrani



Hitrost in smer gibanja fluida



Inducirane termične napetosti v membrani

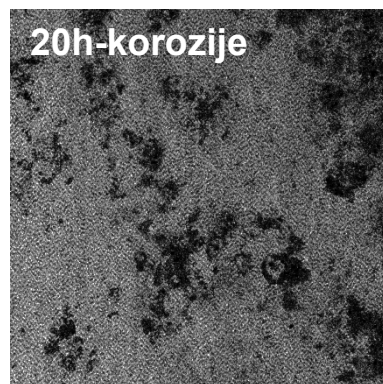
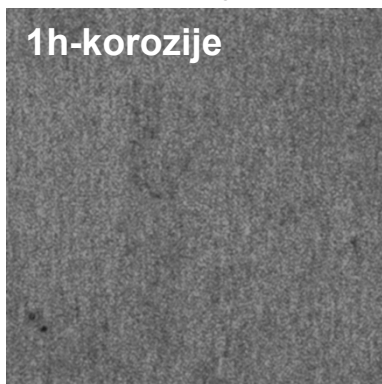


- Modeliranje na mikronivoju
- Spoznavanje s programskim orodjem
- Opis modela na mikronivoju
- Modeliranje različnih scenarijev na mikronivoju

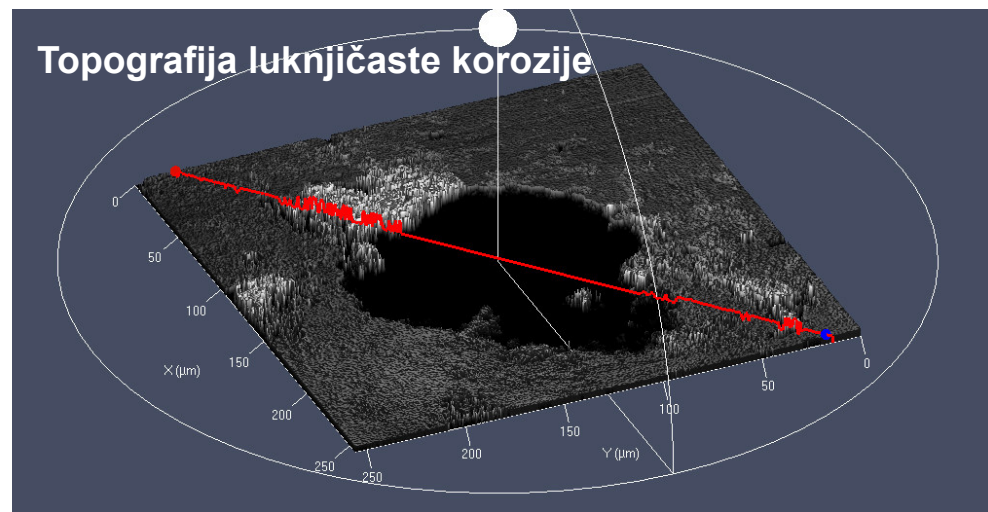
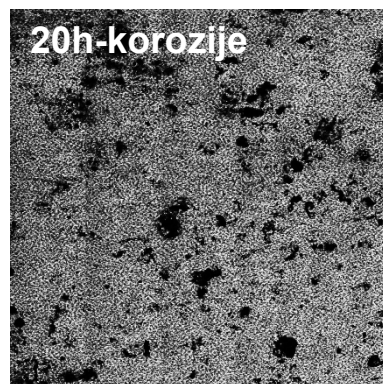
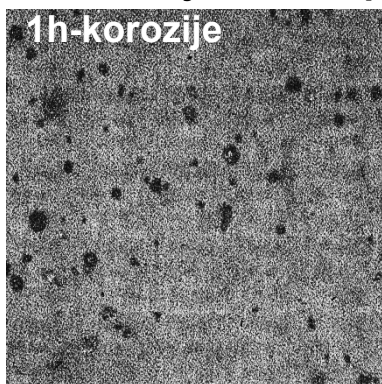
Konfokalna mikroskopija

- Spremljanje korozivskih procesov

Nepolirano jeklo 321, pasivirano



Polirano jeklo 321, pasivirano



Opravljanje diplome v partnerskih organizacijah

- Možnost opravljanja diplome v industriji
- Možnost opravljanja diplome na raziskovalnih inštitutih