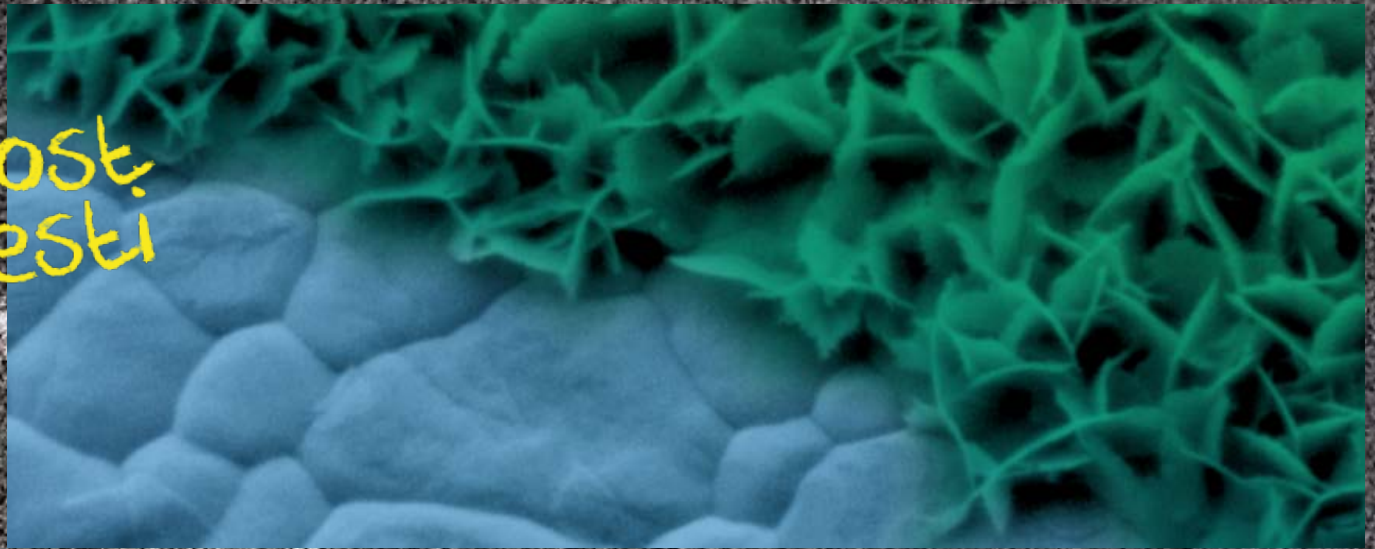


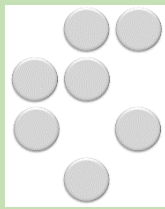
Znanost
na cesti



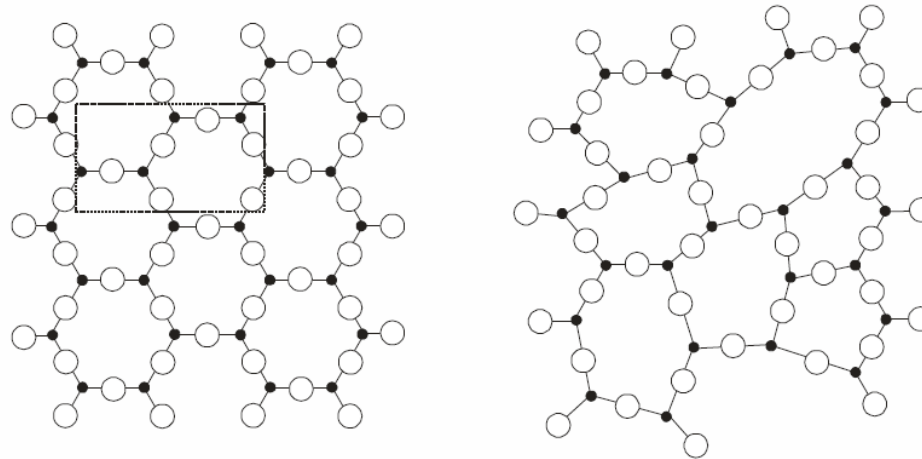
Keramika v času nanotehnologije

dr. Andraž Kocjan, Institut „Jožef Stefan“
Mojca Delač, Radio Slovenija

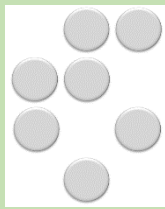
KERAMIKA



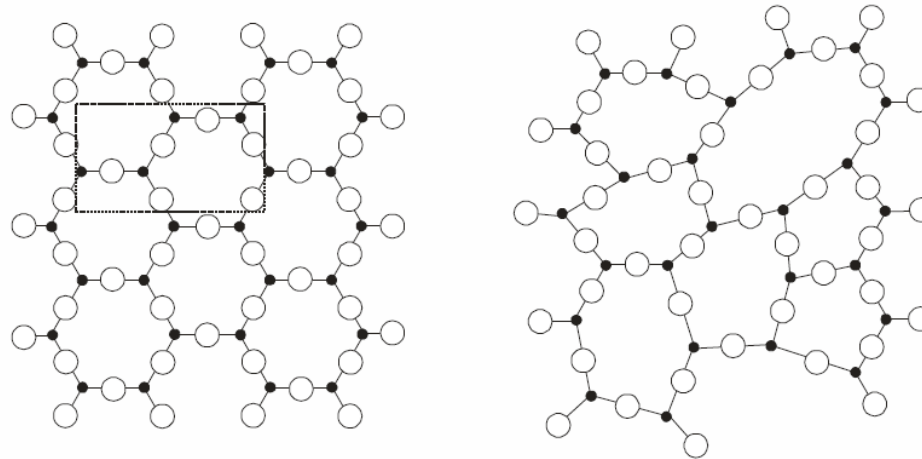
- Anorganski, nekovinski kristalinični in steklasti materiali



KERAMIKA

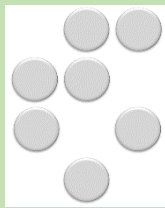


- Anorganski, nekovinski kristalinični in steklasti materiali

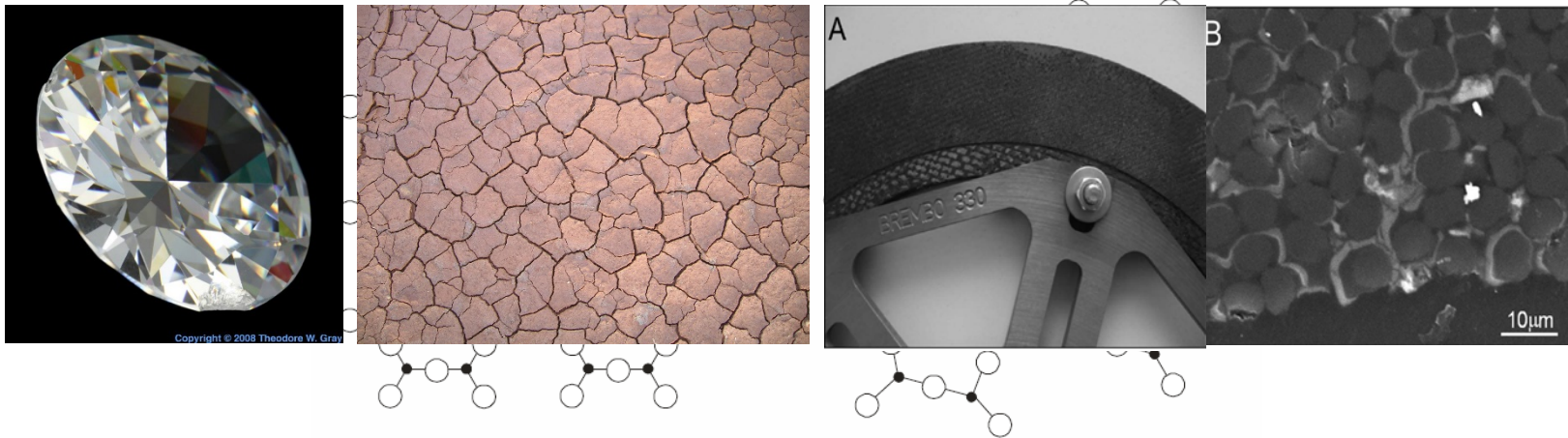


- Množica lastnosti keramičnih materialov:

KERAMIKA

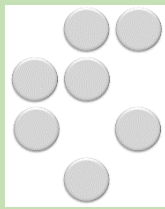


- Anorganski, nekovinski kristalinični in steklasti materiali

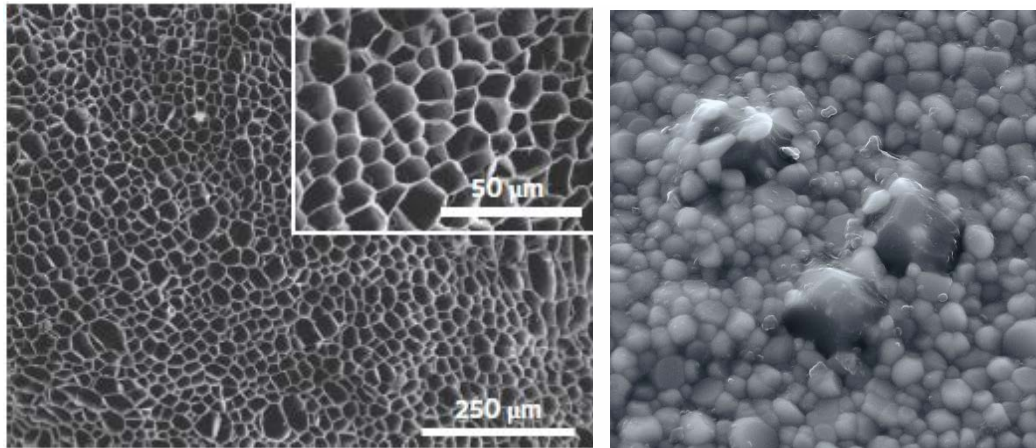


- Množica lastnosti keramičnih materialov:
 - *monokristalinični, polikristalinični ali kompozitni;*

KERAMIKA



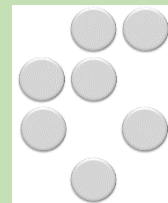
- Anorganski, nekovinski kristalinični in steklasti materiali



- Množica lastnosti keramičnih materialov:

- *monokristalinični, polikristalinični ali kompozitni;*
- *porozni ali gosti;*

KERAMIKA



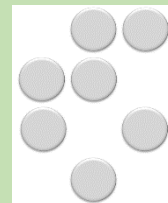
- Anorganski, nekovinski kristalinični in steklasti materiali



- Množica lastnosti keramičnih materialov:

- *monokristalinični, polikristalinični ali kompozitni;*
- *porozni ali gosti;*
- *mehki ali trdi; šibki ali trdni; krhki ali žilavi*

KERAMIKA



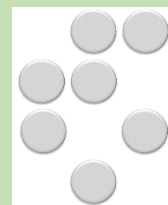
- Anorganski, nekovinski kristalinični in steklasti materiali



- Množica lastnosti keramičnih materialov:

- *monokristalinični, polikristalinični ali kompozitni;*
- *porozni ali gosti;*
- *mehki ali trdi; šibki ali trdni; krhki ali žilavi*
- *opačni ali prosojni*

KERAMIKA



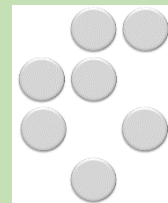
- Anorganski, nekovinski kristalinični in steklasti materiali



- Množica lastnosti keramičnih materialov:

- *monokristalinični, polikristalinični ali kompozitni;*
- *porozni ali gosti;*
- *mehki ali trdi; šibki ali trdni; krhki ali žilavi*
- *opačni ali prosojni*
- *nizka ali visoka temperatura tališča*

KERAMIKA



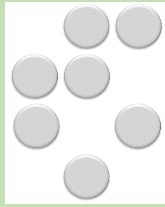
- Anorganski, nekovinski kristalinični in steklasti materiali



- Množica lastnosti keramičnih materialov:

- *monokristalinični, polikristalinični ali kompozitni;*
- *porozni ali gosti;*
- *mehki ali trdi; šibki ali trdni; krhki ali žilavi*
- *opačni ali prosojni*
- *nizka ali visoka temperatura tališča*
- *izolatorji, prevodniki ali superprevodniki*
- *dielektriki*
- *diamagnetni, paramagnetni ali feromagnetni*

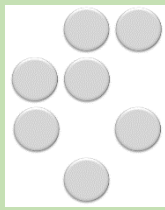
KERAMIKA



- 7000 BC – Začetki izdelovanja in uporabe



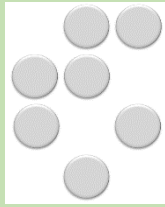
KERAMIKA



- 7000 BC – Začetki izdelovanja in uporabe



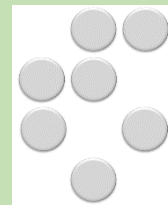
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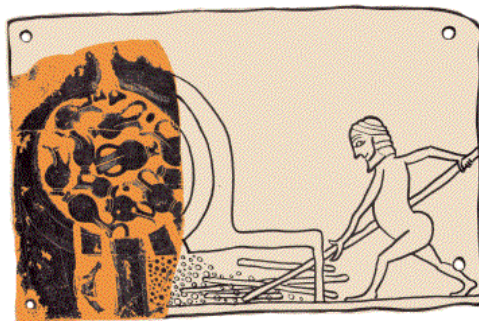
- 7000 BC – Začetki izdelovanja in uporabe



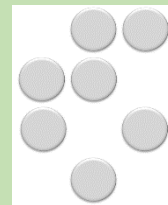
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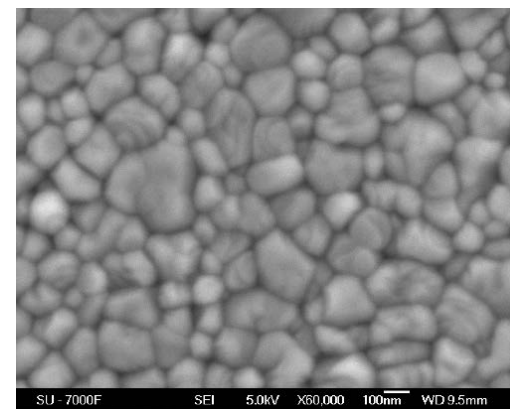
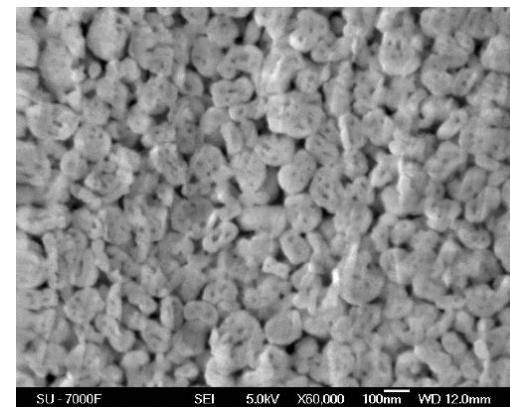
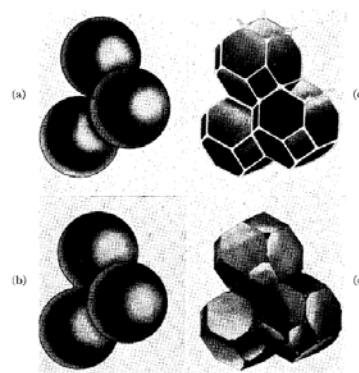
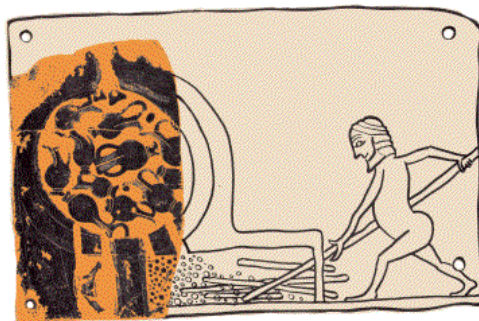
- 7000 BC – Začetki izdelovanja in uporabe
- Oblikovanje, žganje/sintranje



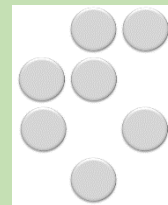
KERAMIKA



- 7000 BC – Začetki izdelovanja in uporabe
- Oblikovanje, žganje/sintranje

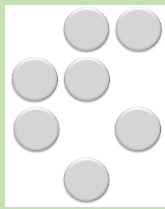


OBLIKOVANJE



- Mokro – ulivanje v mavčne modele

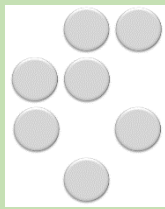
OBLIKOVANJE



- Mokro – ulivanje v mavčne modele



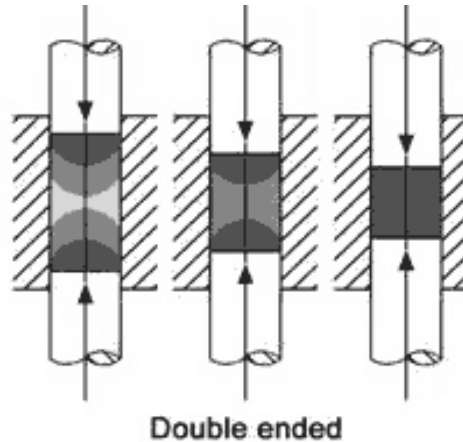
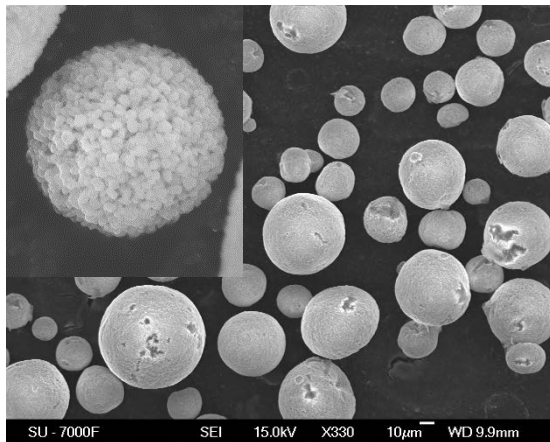
OBLIKOVANJE



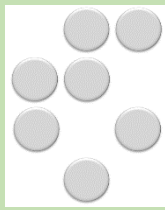
- Mokro – ulivanje v mavčne modele



- Suho – stiskanje granulato, mehansko obdelovanje



NANOTEHNOLOGIJA

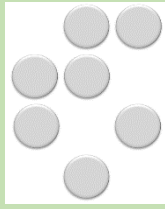


- Manipulacija snovi, ki ima vsaj eno dimenzijo v območju *1–100 nm*.

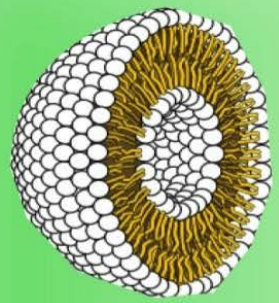
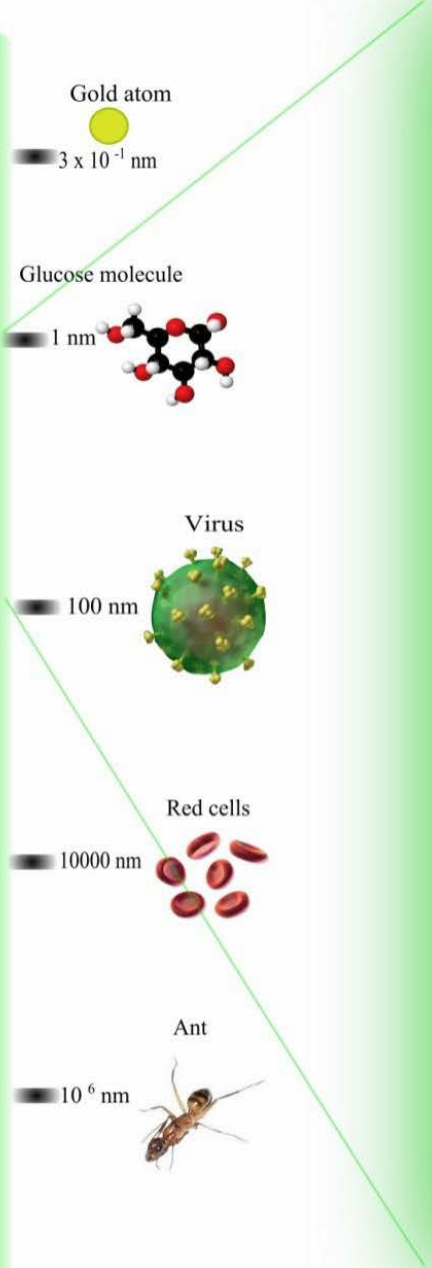
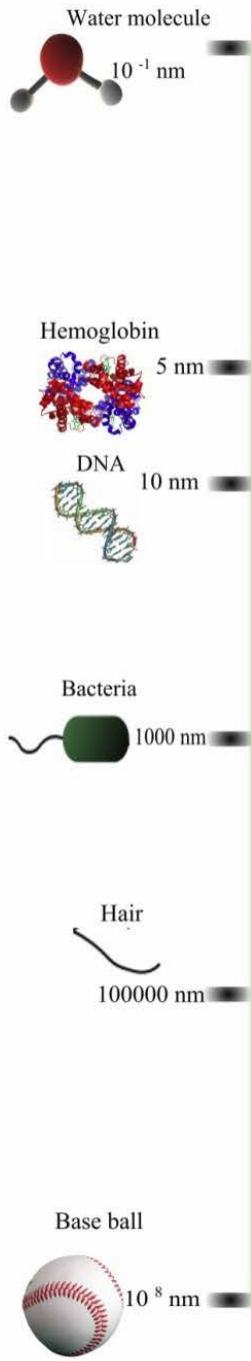
N

• M

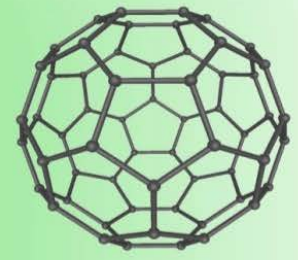
1-



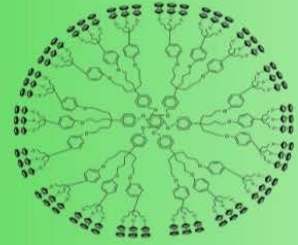
Nanomaterials (1-100 nm)



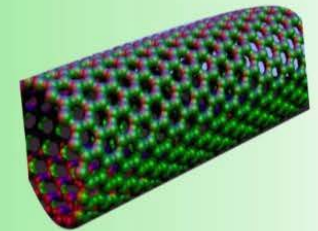
Liposome



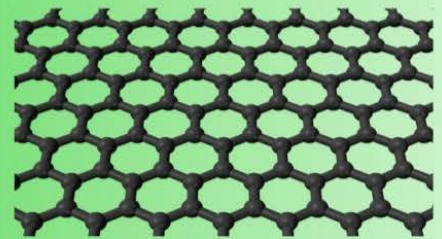
Fullerene



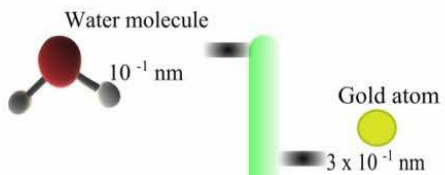
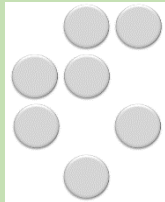
Dendrimer



Carbon nanotube



Graphene

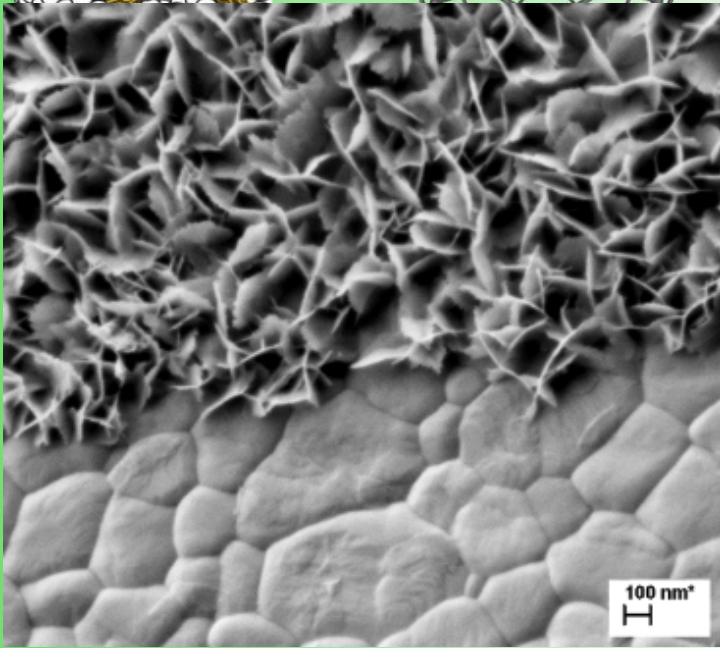
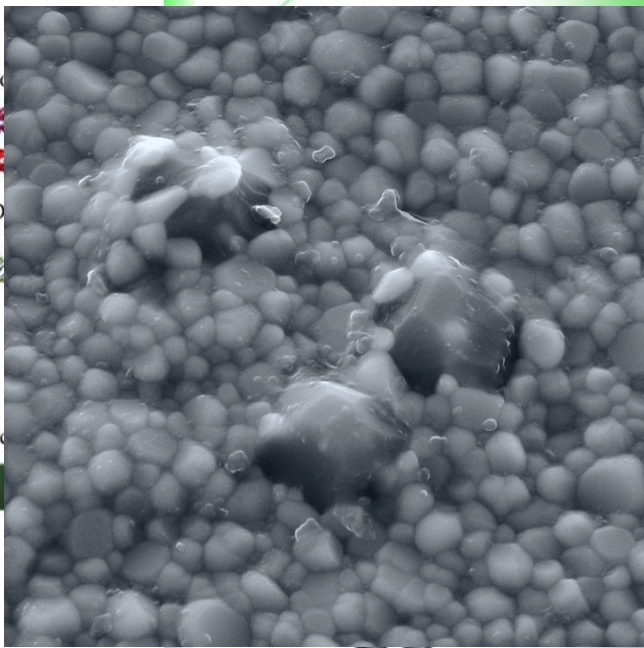


1-

Hemo

D

Bac



Hair

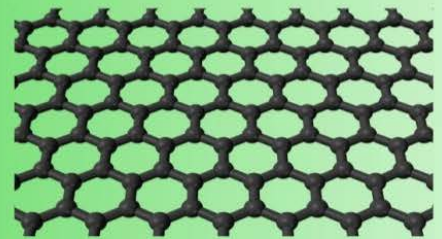
100000 nm

10^6 nm



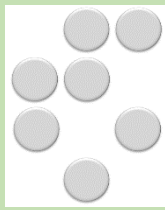
Base ball

10^8 nm



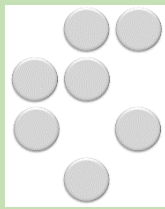
Graphene

NANOTEHNOLOGIJA

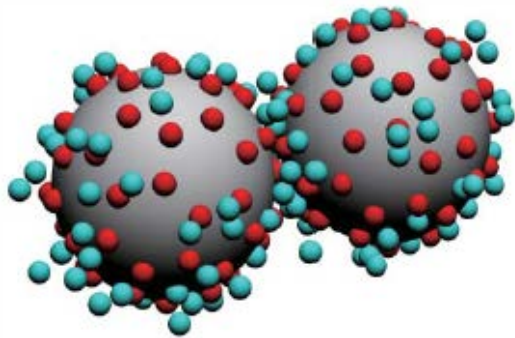


- Manipulacija snovi, ki ima vsaj eno dimenzijo v območju *1–100 nm*.

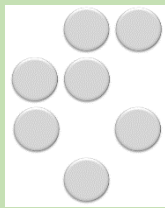
NANOTEHNOLOGIJA



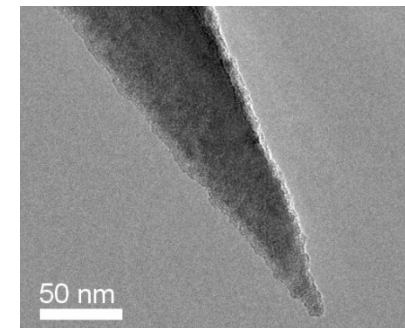
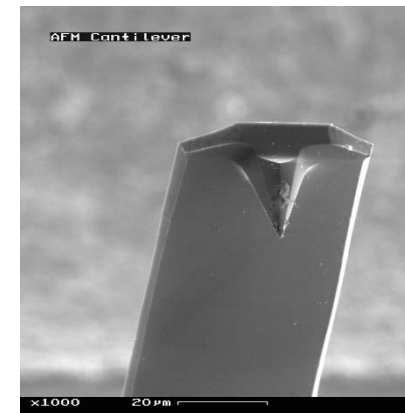
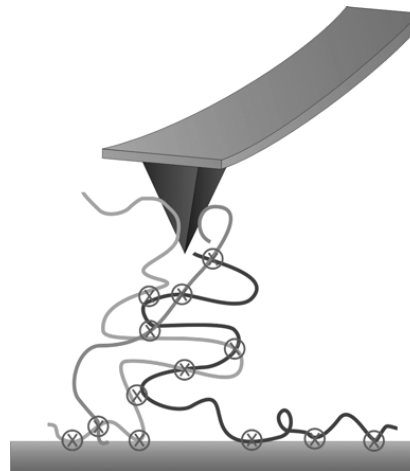
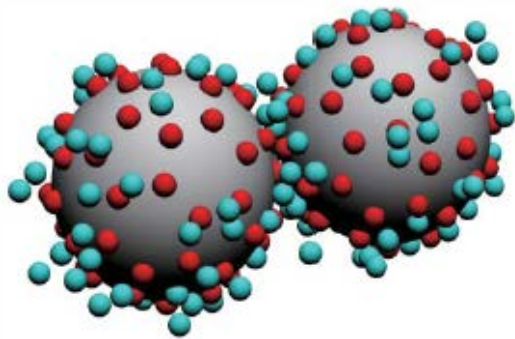
- Manipulacija snovi, ki ima vsaj eno dimenzijo v območju *1–100 nm*.



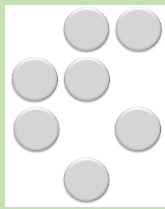
NANOTEHNOLOGIJA



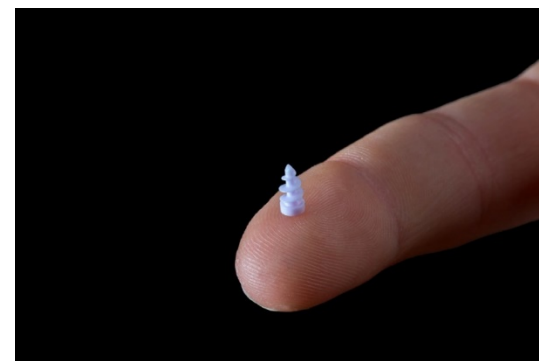
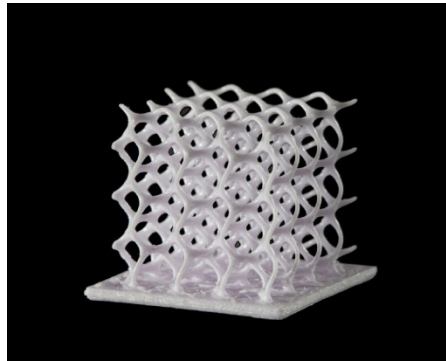
- Manipulacija snovi, ki ima vsaj eno dimenzijo v območju *1–100 nm*.



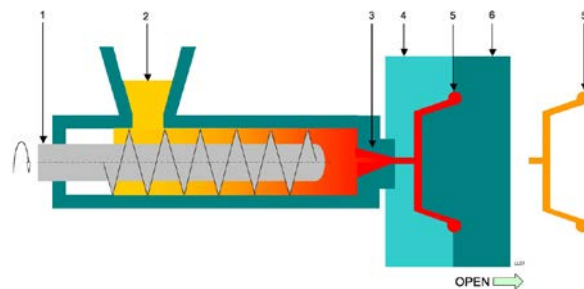
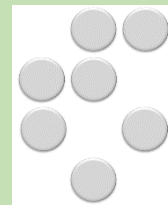
3D TISKANJE KERAMIKE



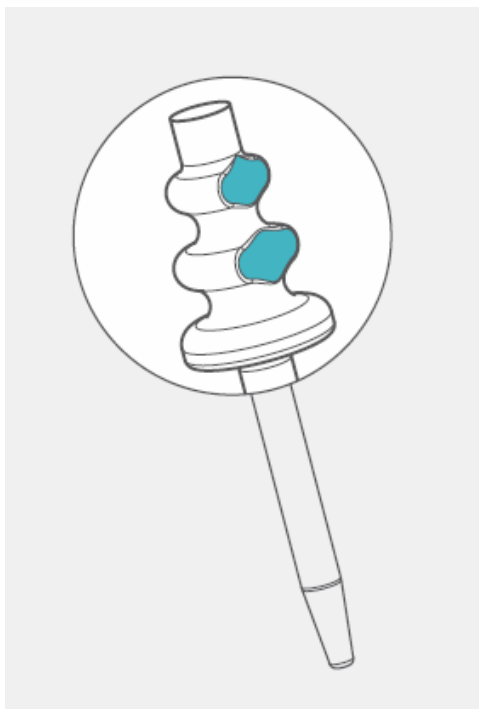
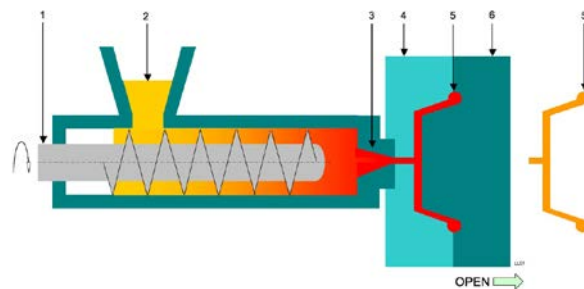
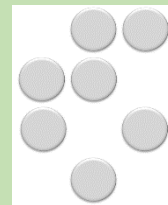
- Aditivno oblikovanje – „sloj po sloj“



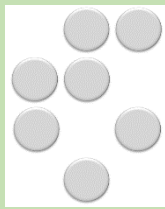
TLAČNO INJEKCIJSKO BRIZGANJE KERAMIKE



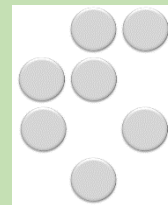
TLAČNO INJEKCIJSKO BRIZGANJE KERAMIKE



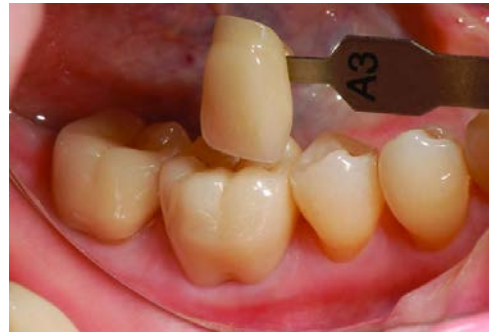
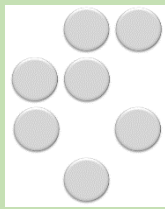
DENTALNA KERAMIKA ZrO_2



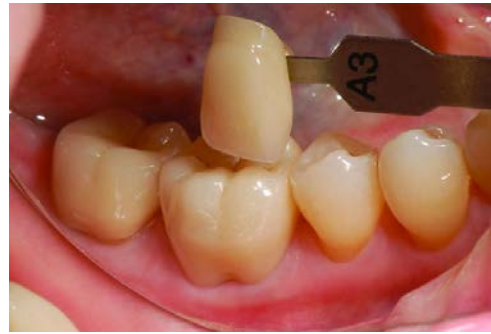
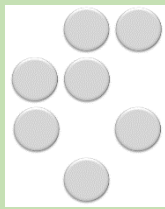
DENTALNA KERAMIKA ZrO_2



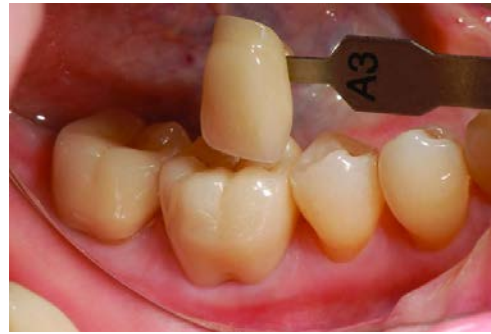
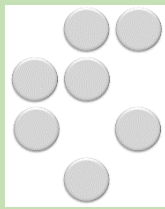
DENTALNA KERAMIKA ZrO_2



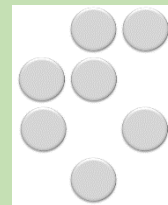
DENTALNA KERAMIKA ZrO_2



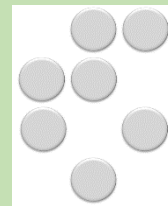
DENTALNA KERAMIKA ZrO_2



DENTALNA KERAMIKA ZrO_2



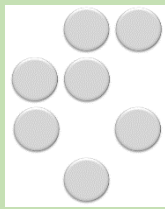
DENTALNA KERAMIKA ZrO_2



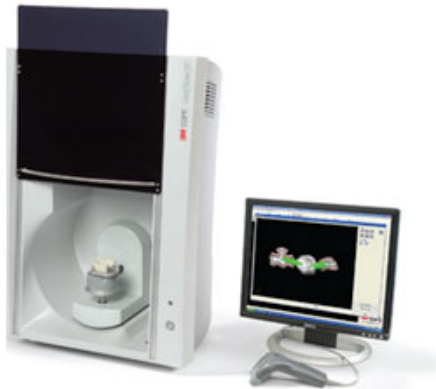
- CAD/CAM postopek



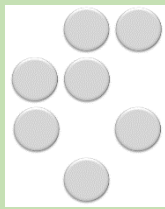
DENTALNA KERAMIKA ZrO_2



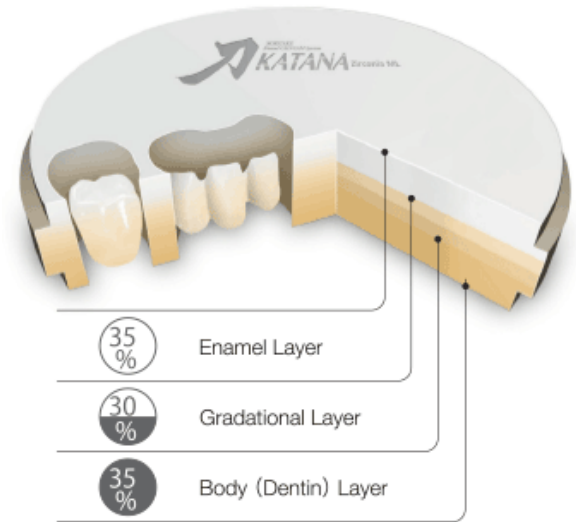
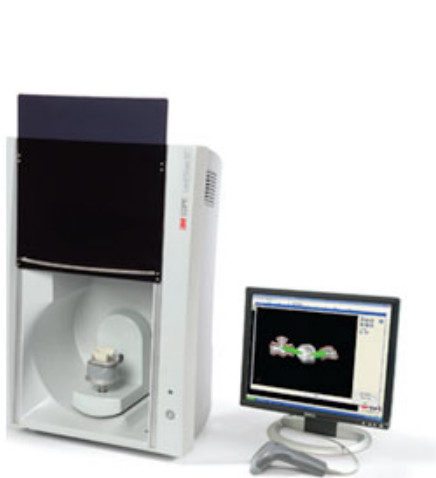
- CAD/CAM postopek



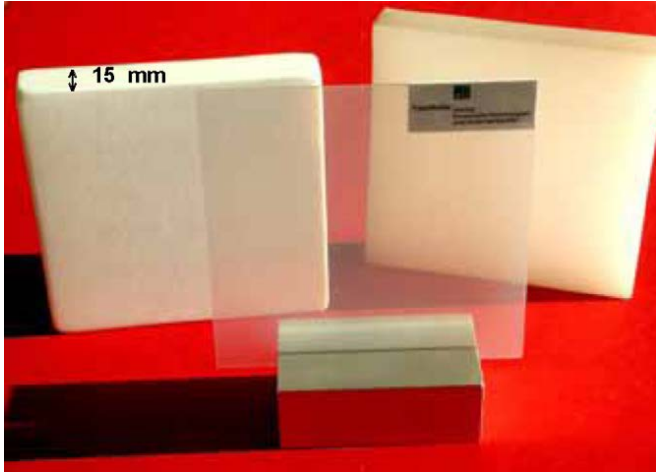
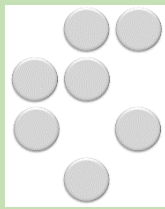
DENTALNA KERAMIKA ZrO_2



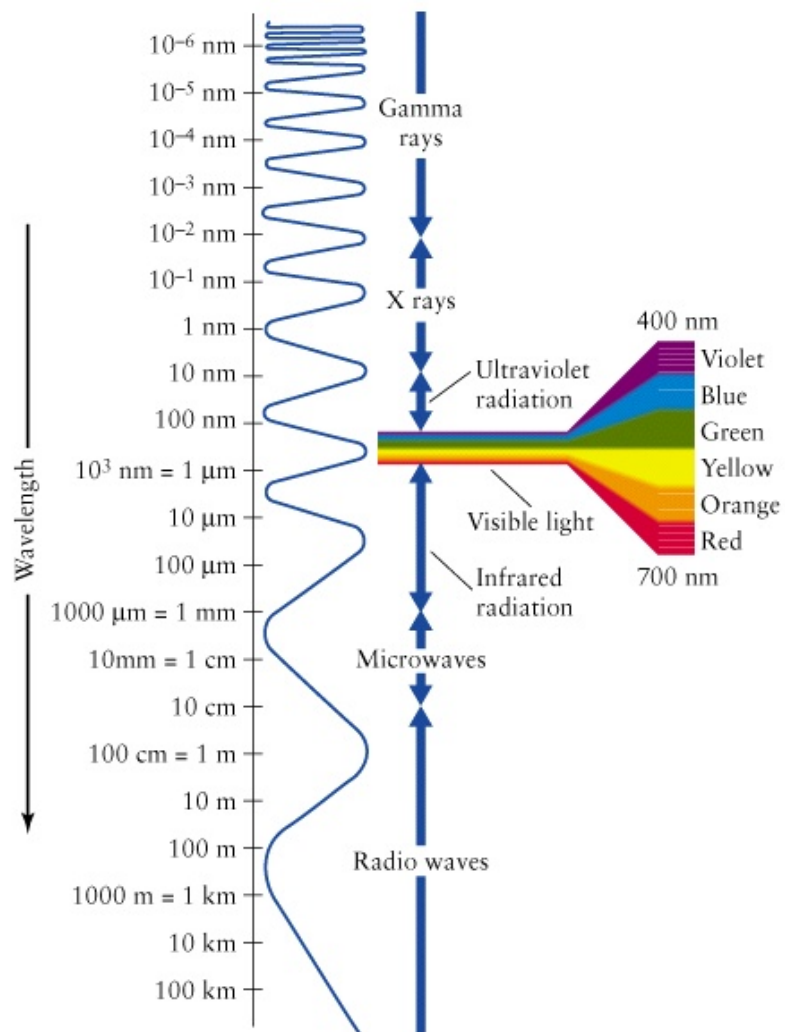
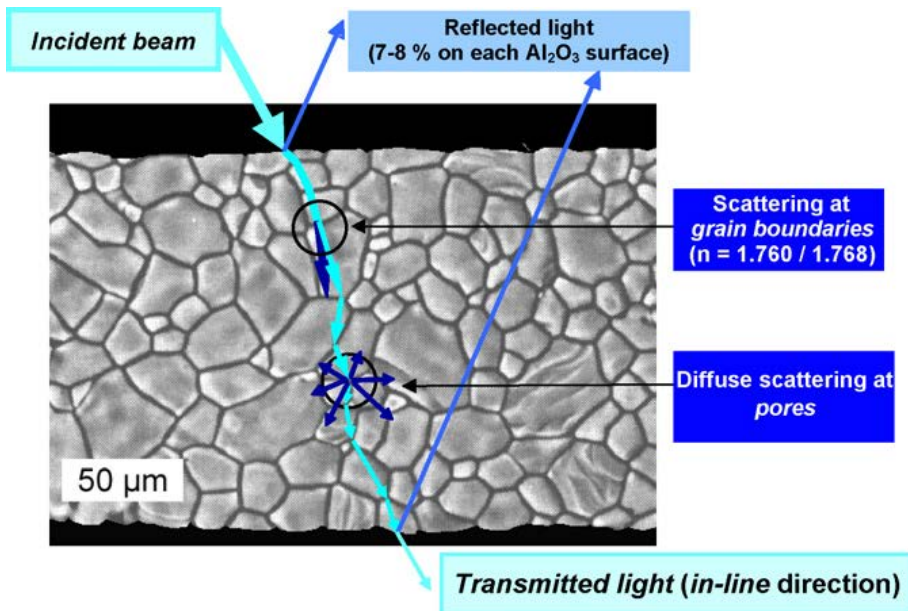
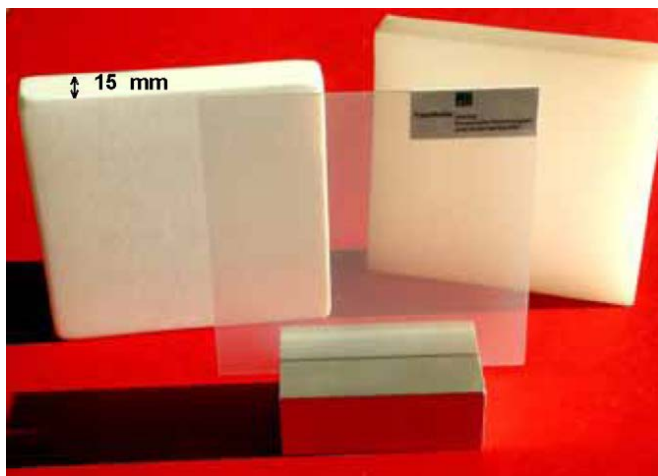
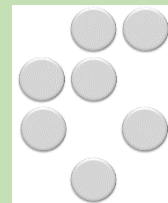
- CAD/CAM postopek



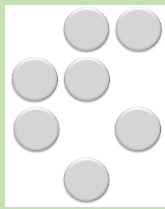
PROSOJNOST KERAMIKE



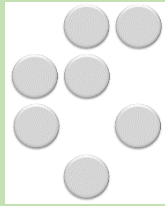
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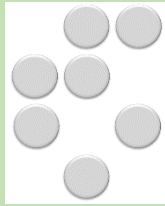
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PROSOJNOST KERAMIKE



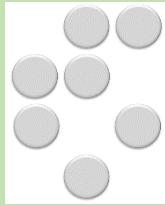
PROSOJNOST KERAMIKE



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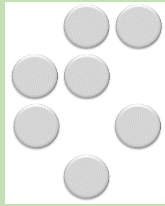
PROSOJNOST KERAMIKE



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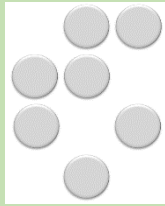
PROSOJNOST KERAMIKE



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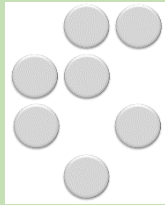
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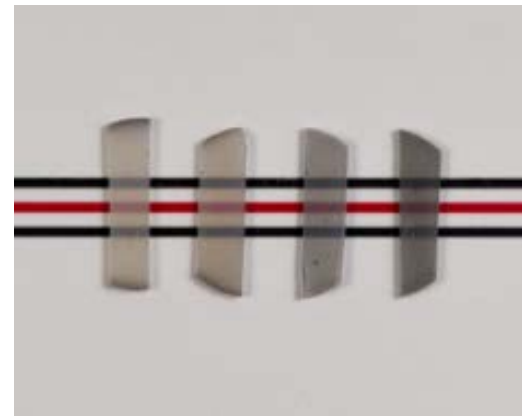
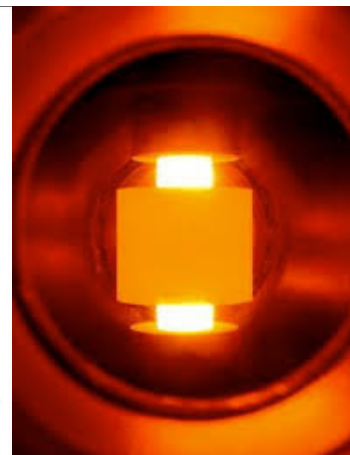
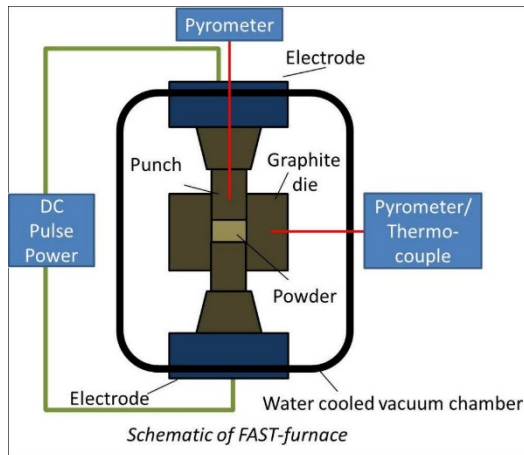
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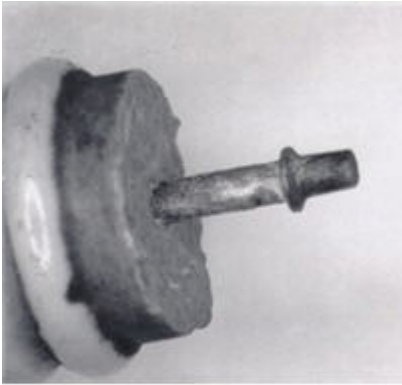
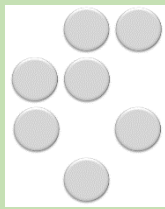
PROSOJNOST KERAMIKE



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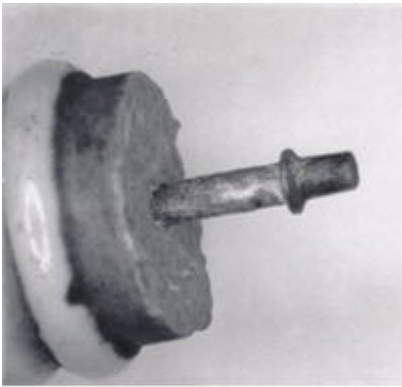
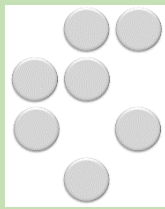


KERAMIKA V AVTOMOBILIH

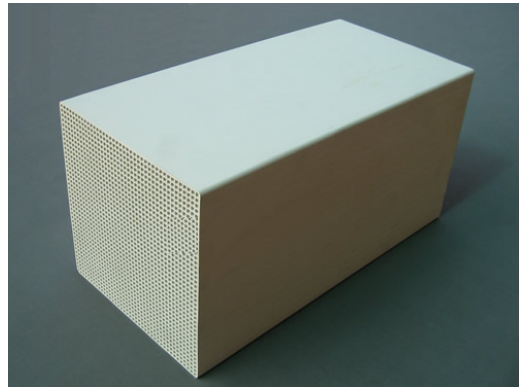


Part of a 1920s-era Champion spark plug.

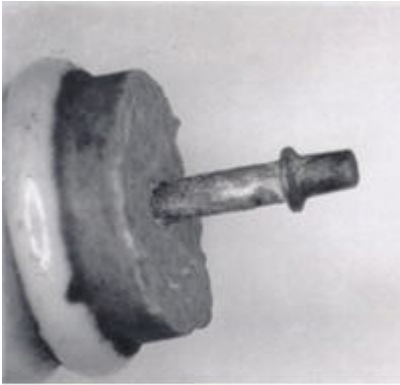
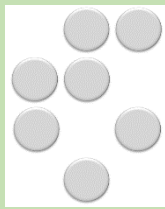
KERAMIKA V AVTOMOBILIH



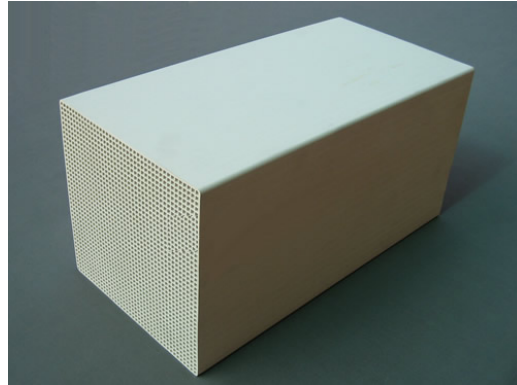
Part of a 1920s-era Champion spark plug.



KERAMIKA V AVTOMOBILIH

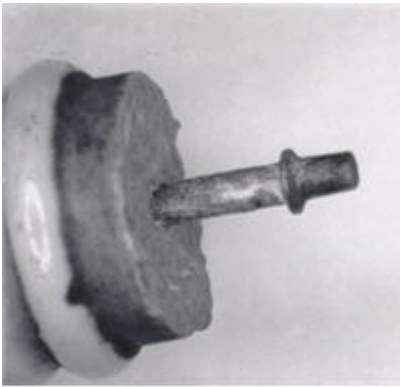
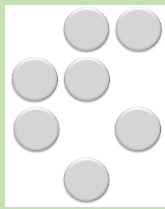


Part of a 1920s-era Champion spark plug.

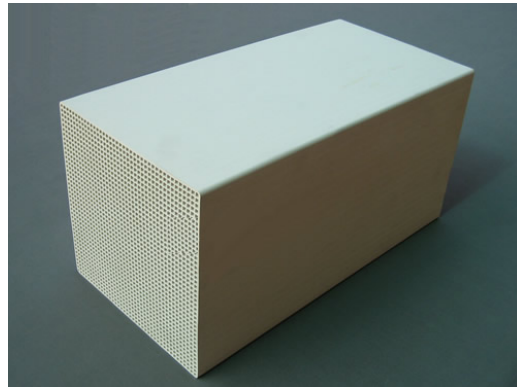


FRIATEC AG

KERAMIKA V AVTOMOBILIH



Part of a 1920s-era Champion spark plug.

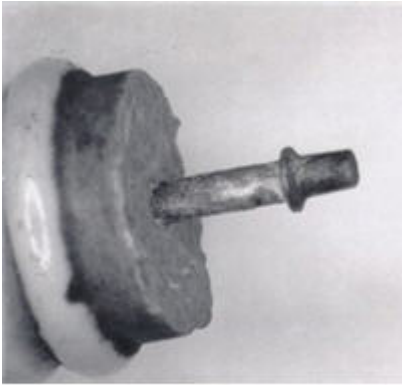
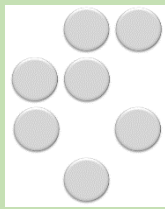


FRIATEC AG

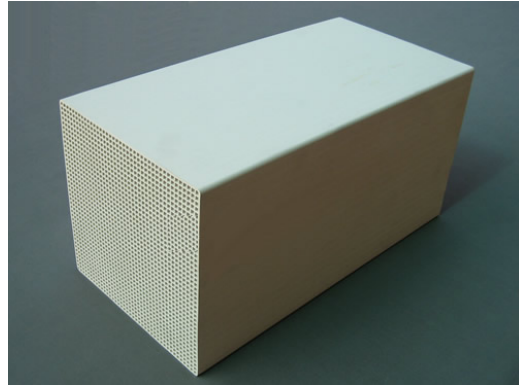


CeramTec

KERAMIKA V AVTOMOBILIH



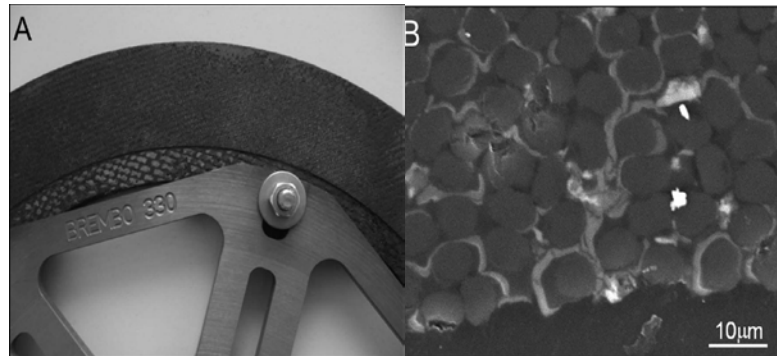
Part of a 1920s-era Champion spark plug.



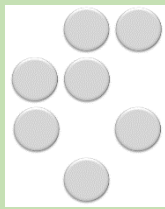
FRIATEC AG



CeramTec



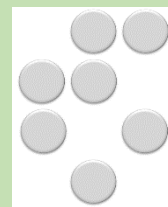
KERAMIČNI SLOJI in PREVLEKE



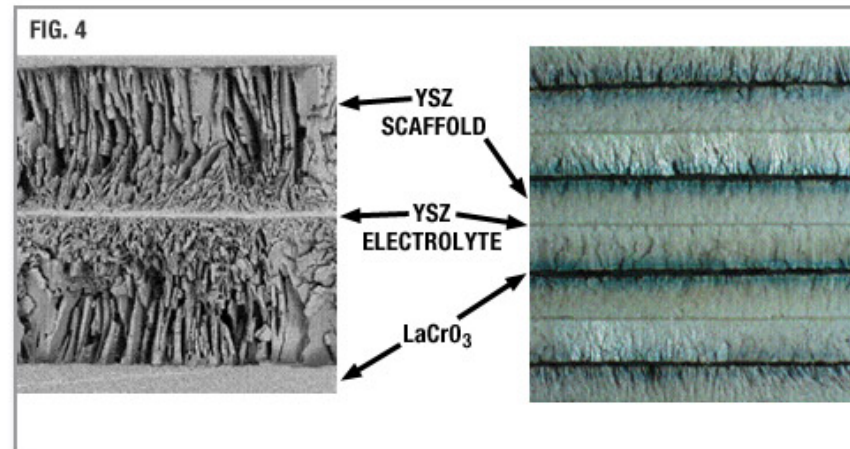
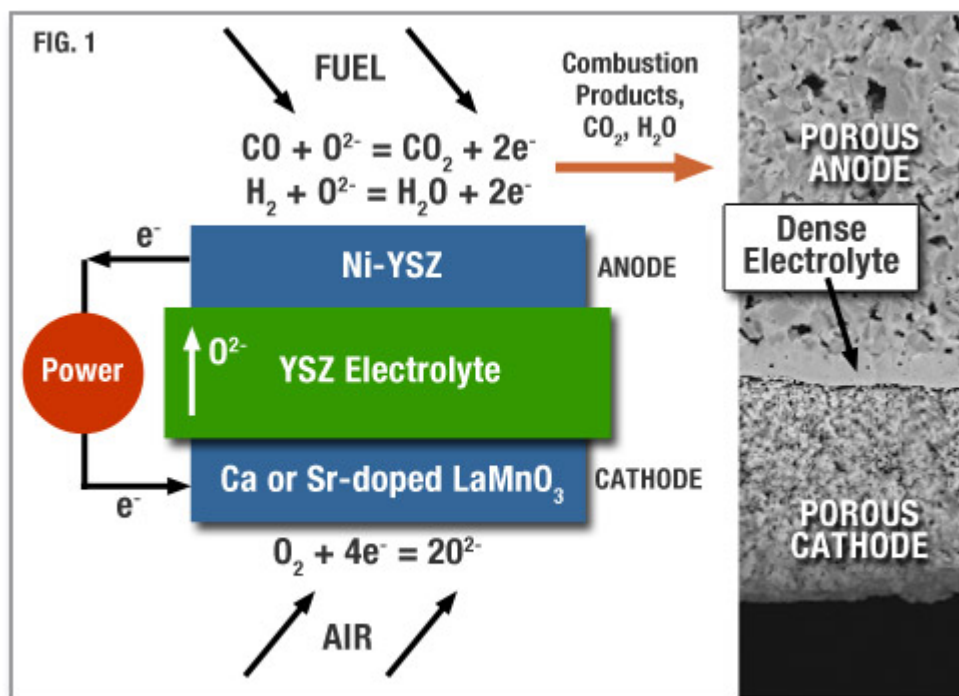
- Gorivne celice s trdim elektrolitom ZrO_2



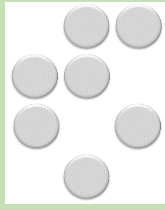
KERAMIČNI SLOJI in PREVLEKE



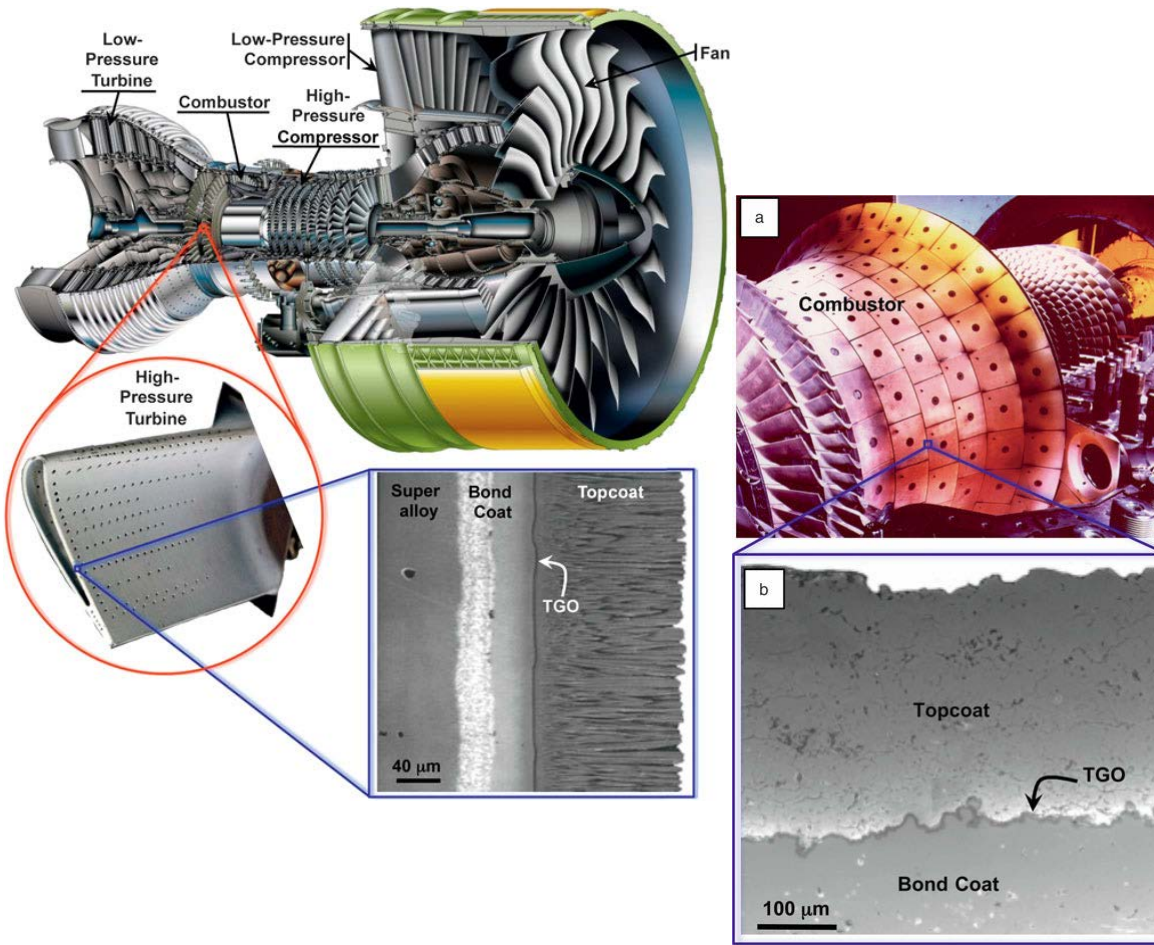
- Gorivne celice s trdim elektrolitom ZrO_2



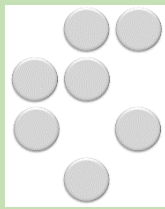
KERAMIČNE PREVLEKE



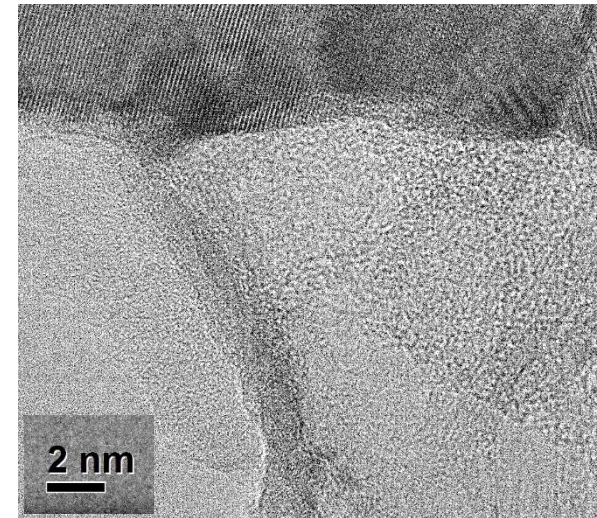
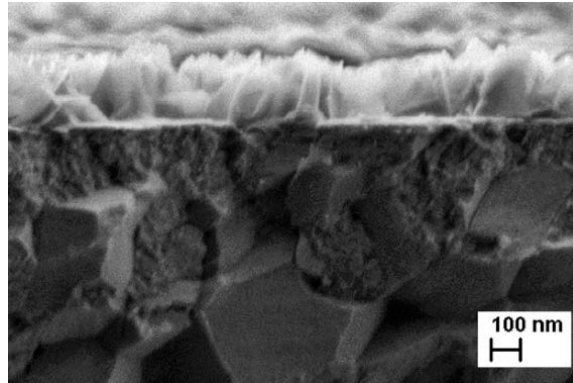
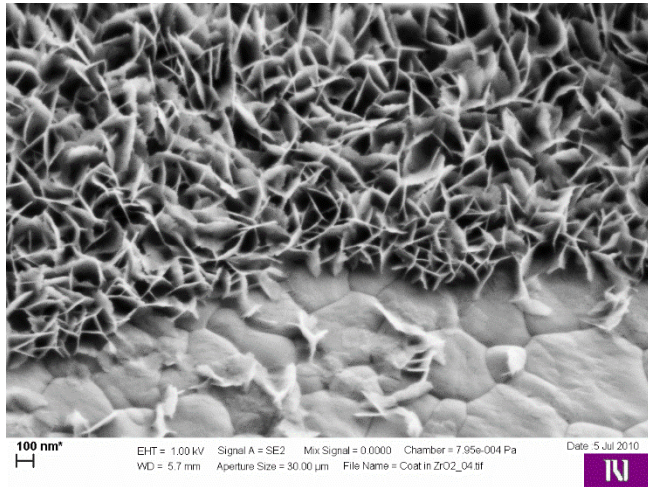
- Ognjevzdržne prevleke ZrO_2



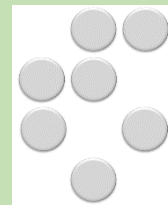
NANOSTRUKTURNE PREVLEKE



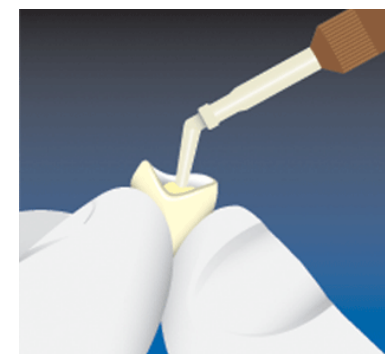
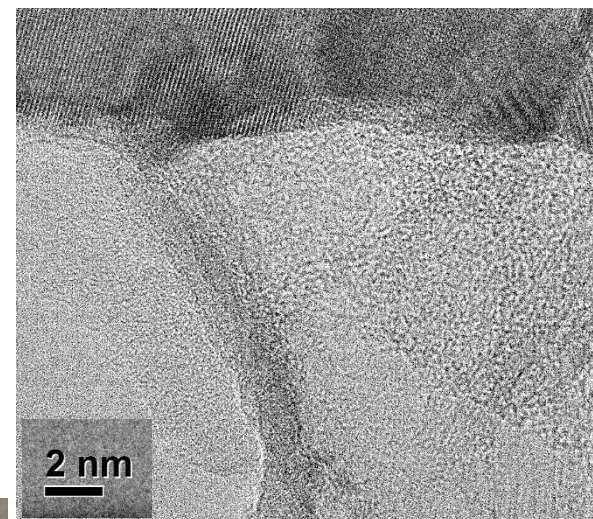
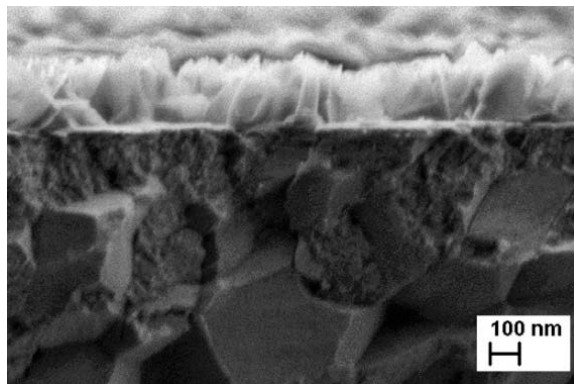
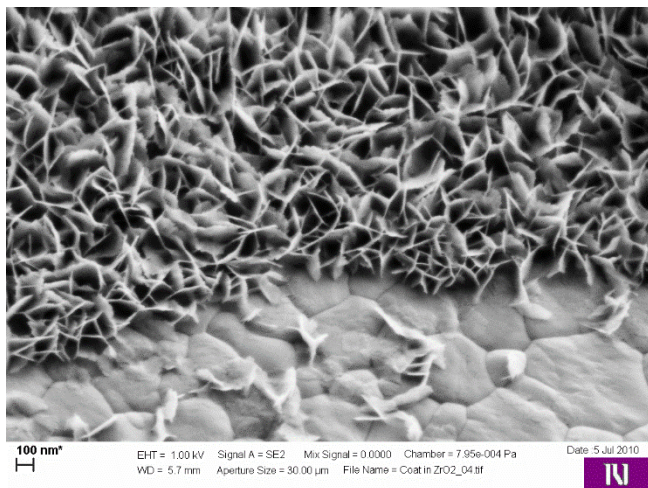
- Adhezivna prevleka Al_2O_3 za dentalno keramiko ZrO_2



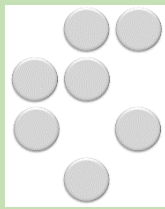
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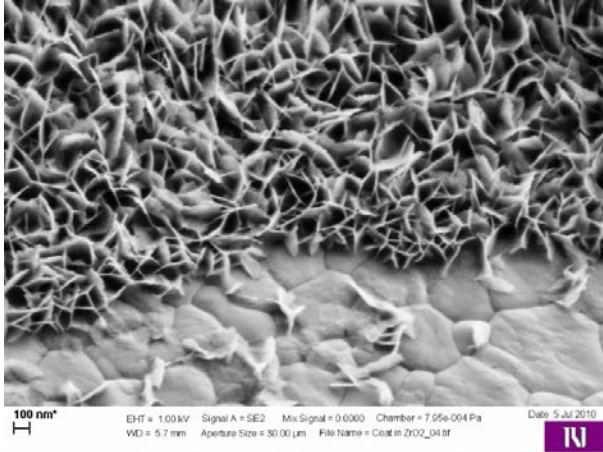
- Adhezivna prevleka Al_2O_3 za dentalno keramiko ZrO_2



NANOSTRUKTURNE PREVLEKE

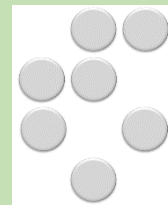


- Samočistilna prevleka

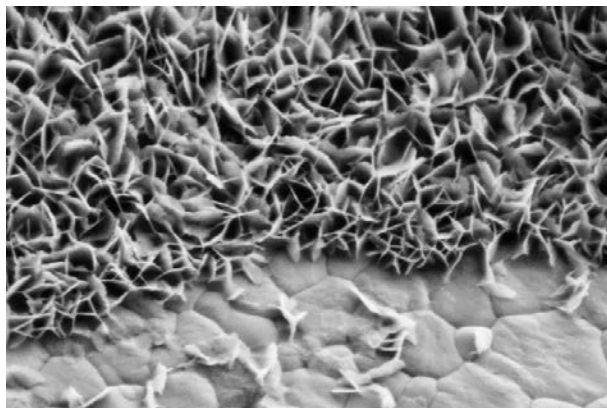


<https://www.youtube.com/watch?v=djgiRPDdH00>

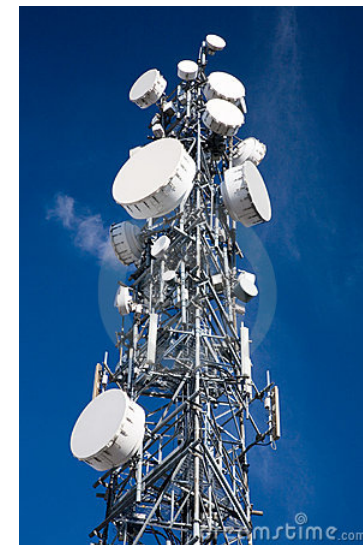
NANOSTRUKTURNE PREVLEKE



- Samočistilna prevleka

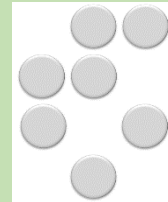


100 nm*
EHT = 1.00 kV Signal A = SE2 Mix Signal = 0.0000 Chamber = 7.95e-004 Pa Date: 5 Jul 2010
WD = 5.7 mm Aperture Size = 30.00 µm File Name = Coat in 2102_04.tif

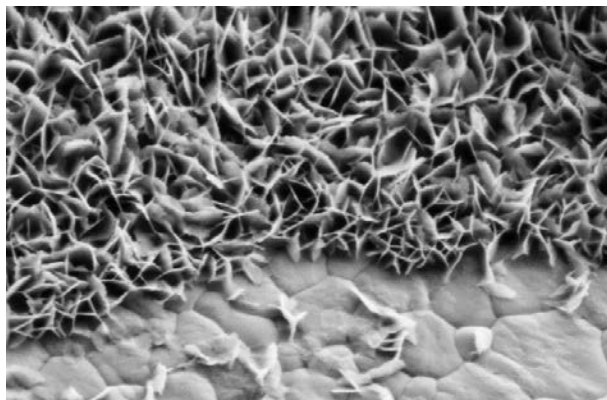


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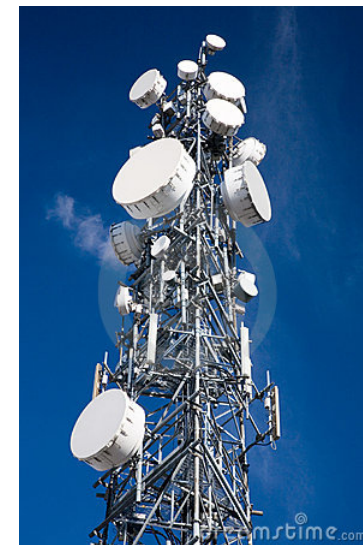
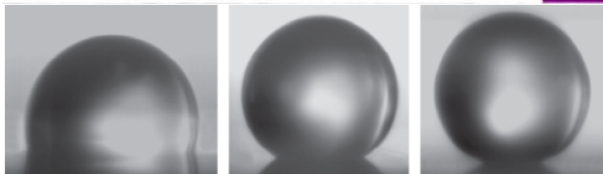
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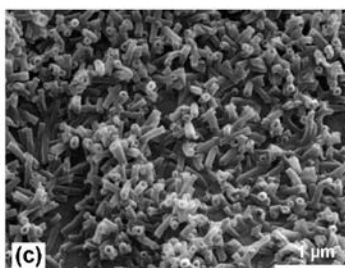
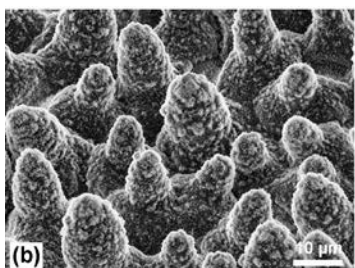
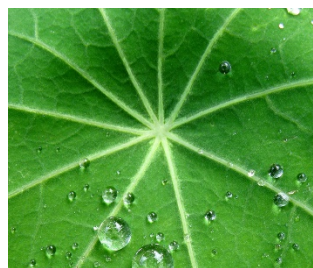
- Samočistilna prevleka



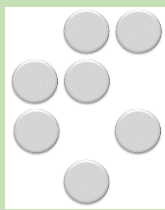
100 nm* EHT = 1.00 kV Signal A = SE2 Mix Signal = 0.0000 Chamber = 7.95e-004 Pa Date: 5 Jul 2010
WD = 5.7 mm Aperture Size = 30.00 μ m File Name = Coat in 2102_04.tif



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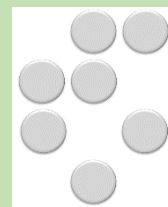
KAJ PA JUTRI?



- Lasersko 3D tiskanje keramike



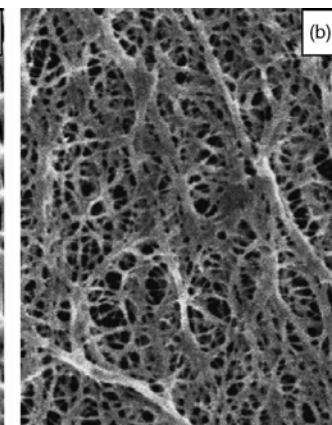
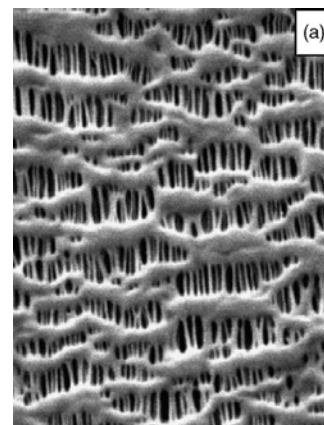
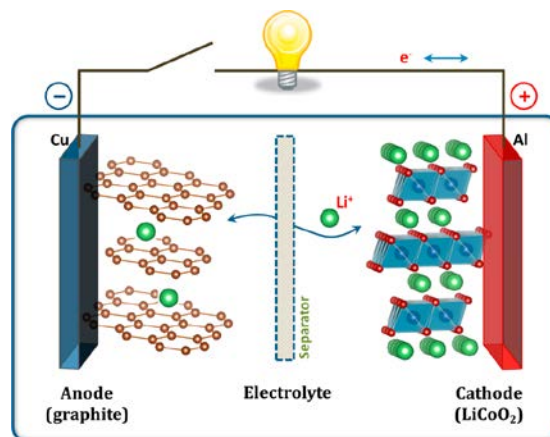
KAJ PA JUTRI?



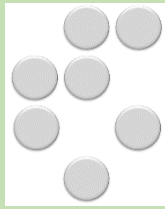
- Lasersko 3D tiskanje keramike



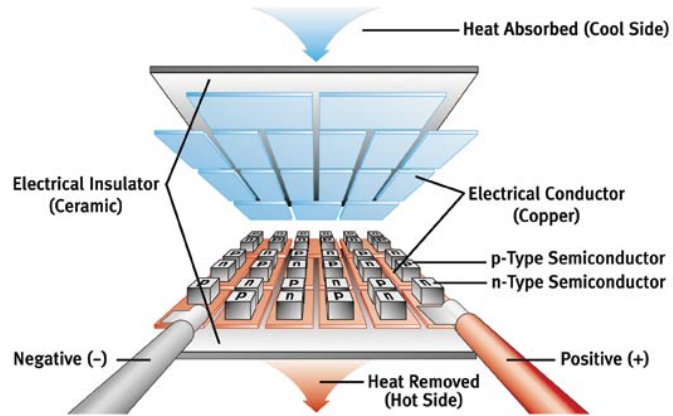
- Baterije – keramični separatorji



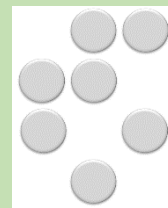
KAJ PA JUTRI?



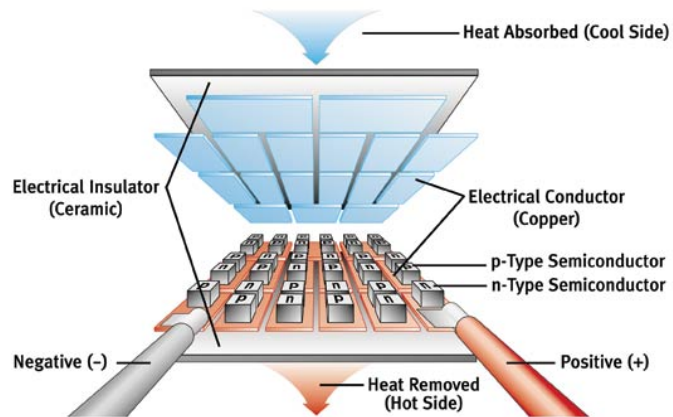
- Termoelektriki



KAJ PA JUTRI?



- Termoelektriki

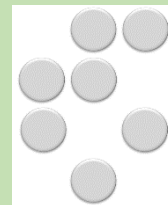


- Nanostrukturne transparentne prevleke

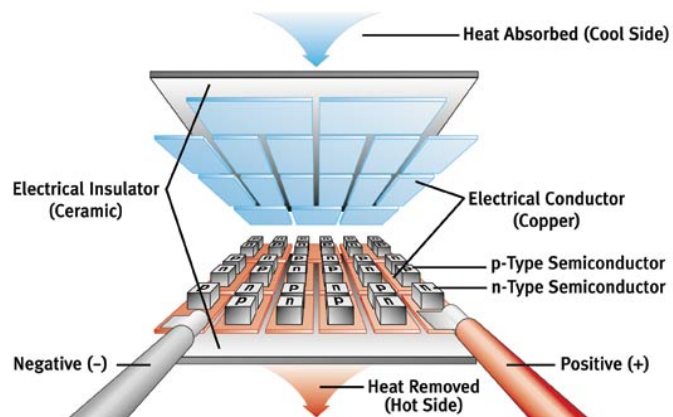


The new PPG windshield blocks 90 percent of the sun's infrared rays.

KAJ PA JUTRI?



- Termoelektriki

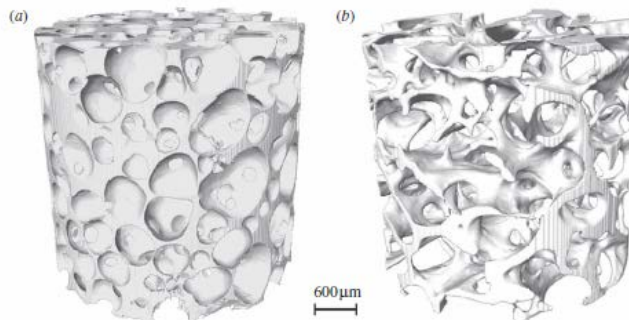
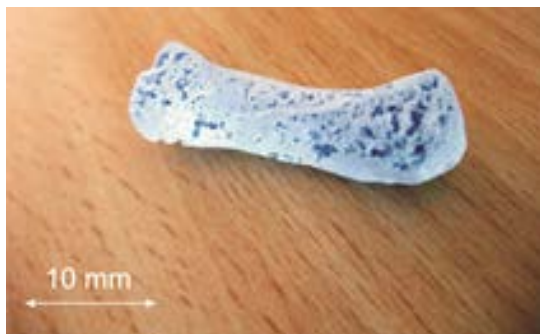


- Nanostrukturne transparentne prevleke

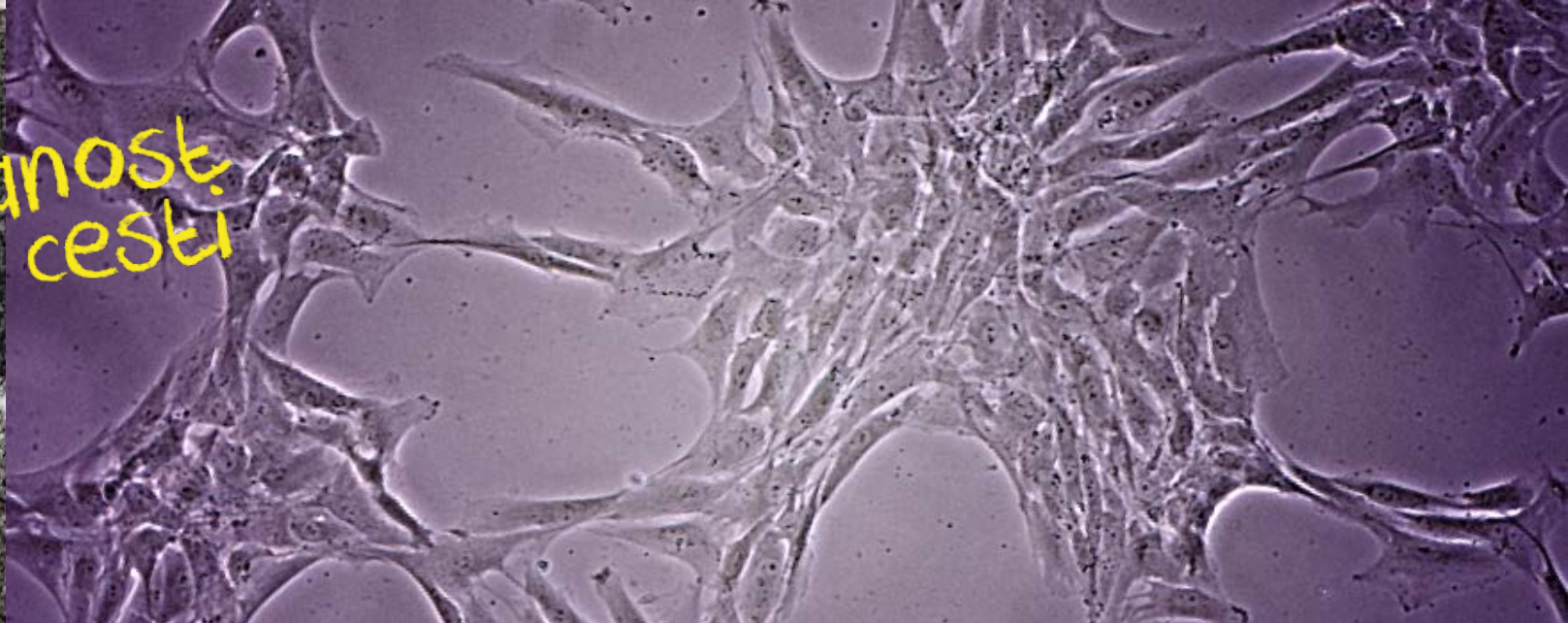


The new PPG windshield blocks 90 percent of the sun's infrared rays.

- Biokeramika – Kostni implantati in „tkivno inženirstvo“



Znanost
na cesti



Dragocenosti v biobanki – zdravljenje z matičnimi celicami

13. maj 2015 ob 19h

prof. Miomir Knežević, Educell in Biotehniška fakulteta, UL
Renata Dacinger, TV Slovenija

