



Εφαρμογές της Τεχνολογίας στην Ιατρική Από τον Μακρόκοσμο στον Νανόκοσμο

Δρ. Νίκος Βορδός

Καβάλα, 2018

Nanotechnology

Nanomedicine

Macro

Nano

Medicine

Bioengineering

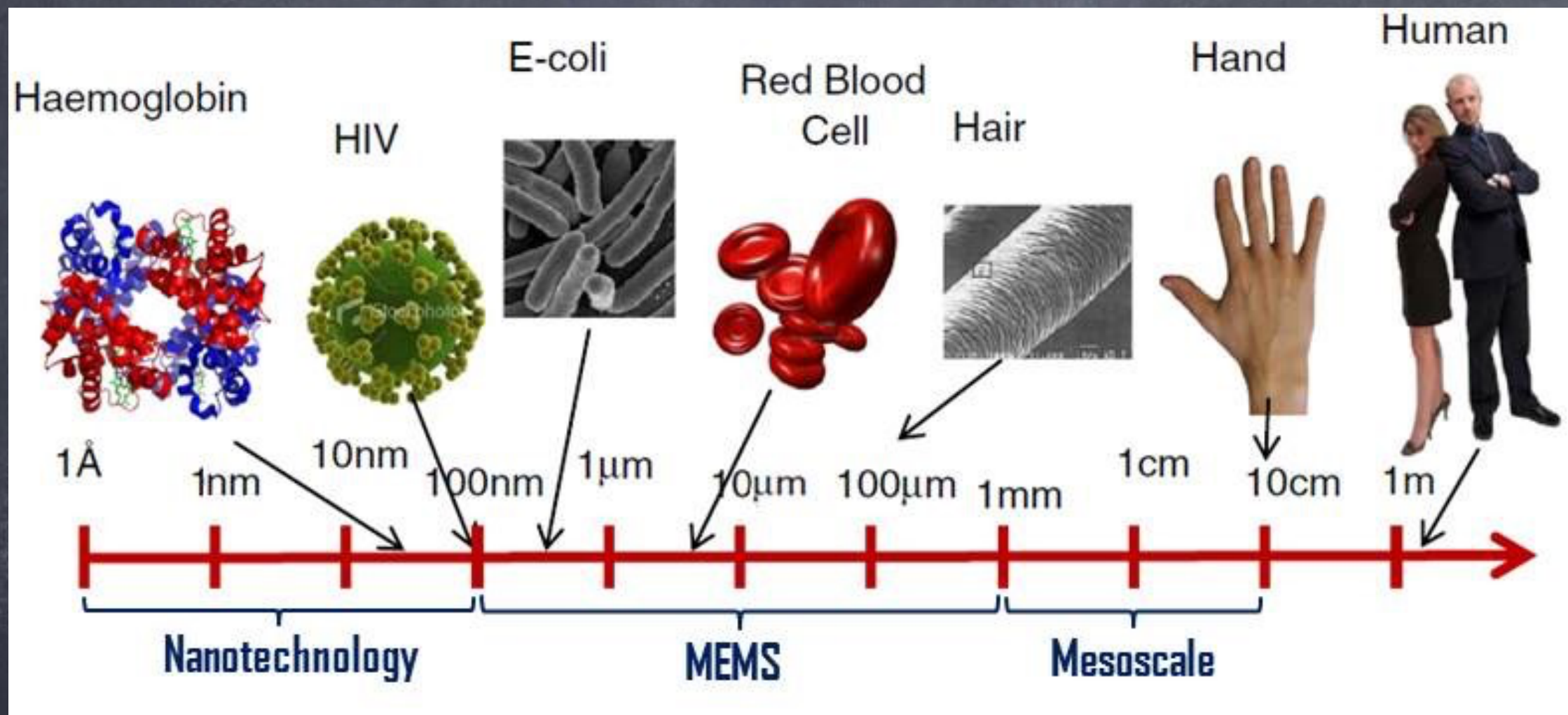


Μακρο – Μάκρο
Αρχαία Ελληνική Λέξη
μακρός
Κάτι πολύ μεγάλο
Δεν αναφέρεται σε
συγκεκριμένες διαστάσεις

Νανο – Νάνο
Αρχαία Ελληνική Λέξη νᾱνος

10^{-9} = 0,000 000 001





Ιατρική

Η επιστήμη και η τέχνη
που ασχολείται με την
έρευνα και την εφαρμογή
μεθόδων και τεχνικών για
την πρόληψη, τη διάγνωση
και τη θεραπεία των
ασθενειών του ανθρώπου



Angèle Kremer-Marietti, Thèmes et structures dans l'œuvre de Nietzsche,

Revue Philosophique de Louvain Année 1967 Volume 65 Numéro 87 pp. 400-401

Μηχανική

Ευρύς κλάδος της φυσικής

– συμπεριφορά φυσικών
σωμάτων

“Η τέχνη των Μηχανών”

Ρίζες – Αριστοτέλη,
Αρχιμήδη.....

Νευτώνια Μηχανική

Τεχνική Μηχανική

Υδρομηχανική

Εφαρμοσμένη Μηχανική

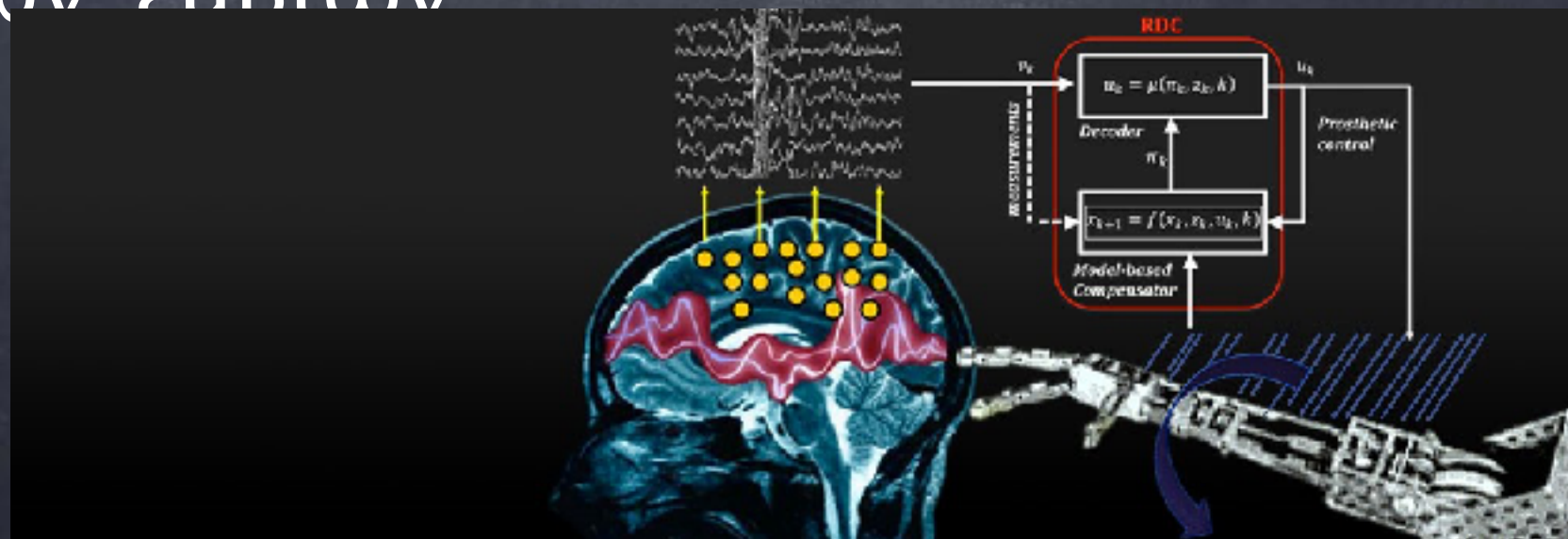
Εμβιομηχανική

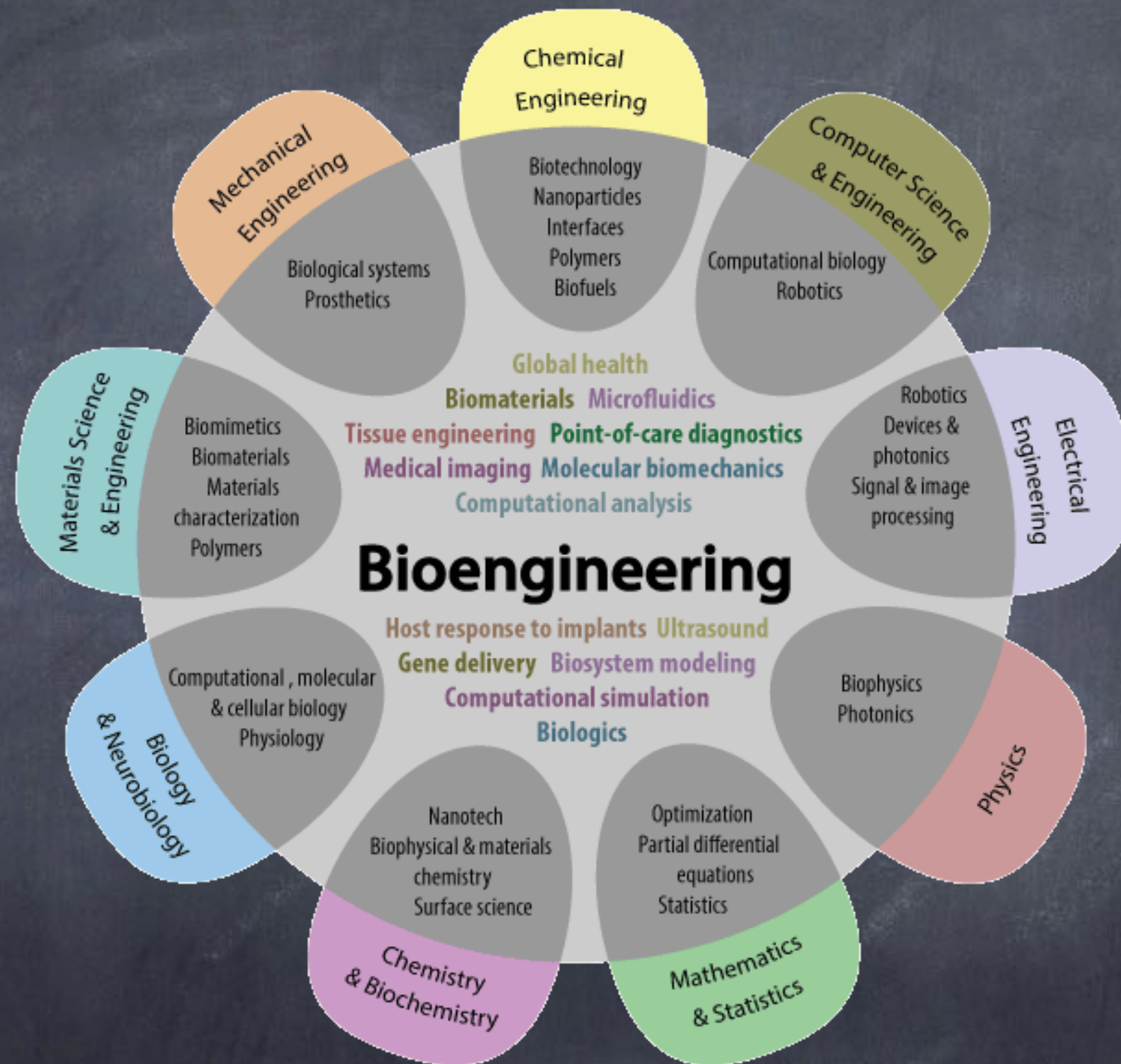


CERN

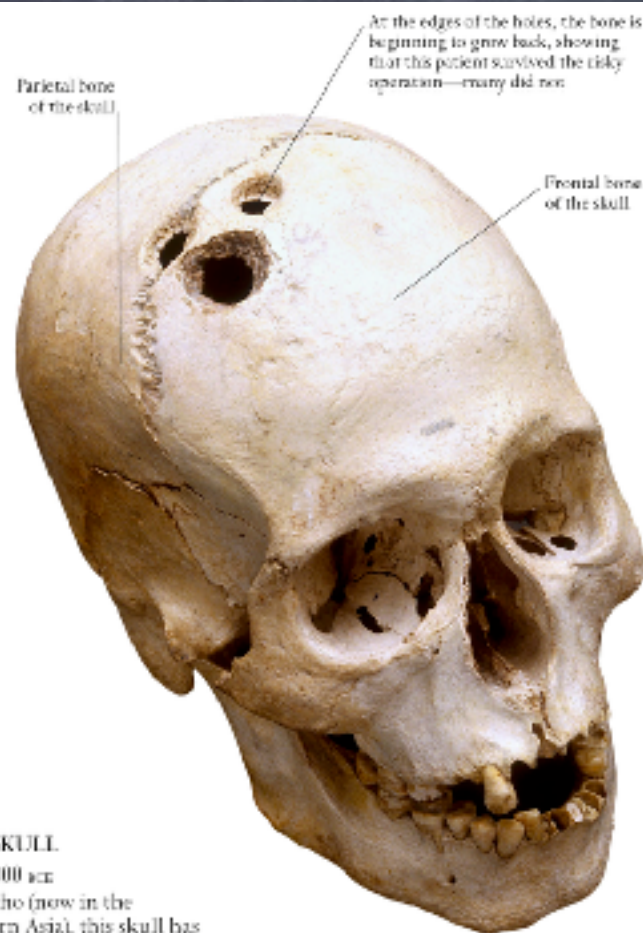
Βιοεργαλειοεπιστήμη

Η επιστήμη δια της οποίας εφαρμόζοντας αρχές και μεθόδους της μηχανικής, της φυσικής, της χημείας, των μαθηματικών καθώς και της τεχνολογίας στην βιολογία και την ιατρική, οι επιστήμονες προσπαθούν να ερμηνεύσουν αλλά και να βελτιώσουν, ποιοτικά και ποσοτικά, την συμπεριφορά των έμβιων οργανισμών.





5500 π.Χ. – Η πρώτη λίθος του
ουροποιητικού (Θ) – Μεσολιθική Εποχή
3300 π.Χ. – Η δεύτερη λίθος.
460 – 370 π.Χ. Ιπποκράτης



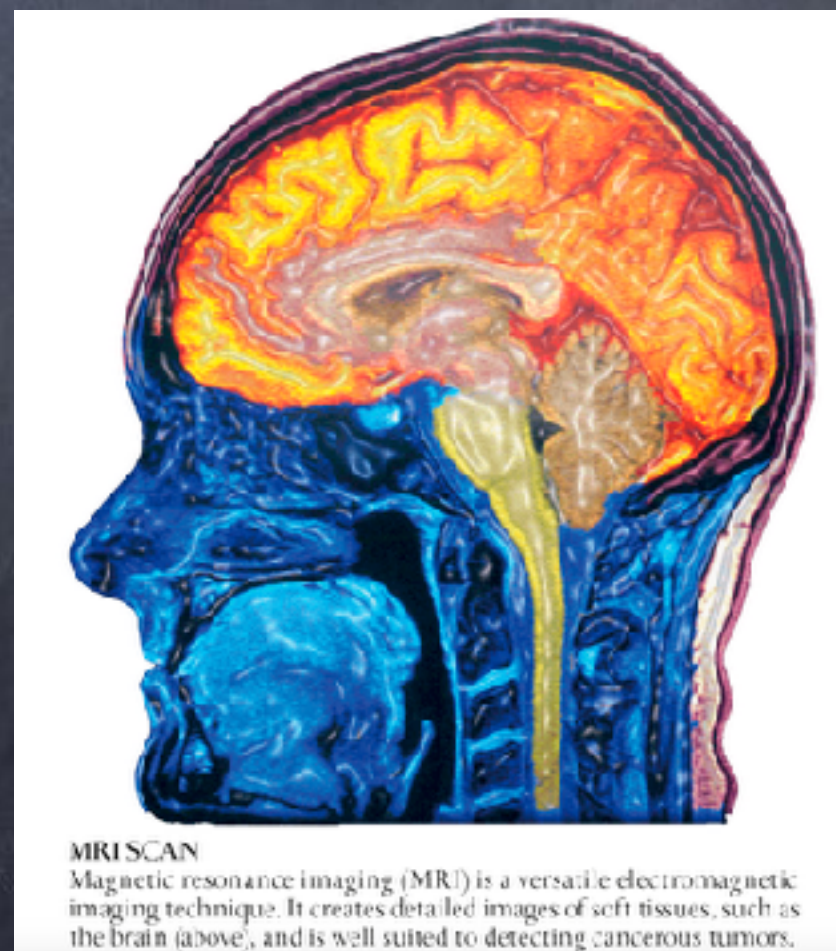
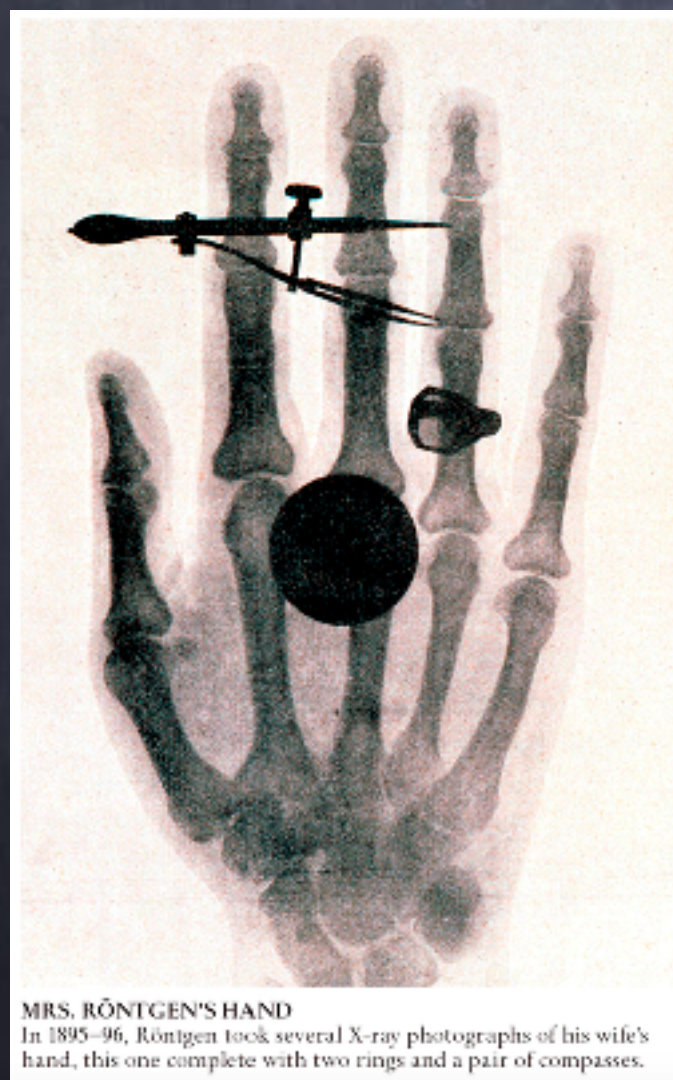
BRONZE AGE SKULL

ISRAEL, 2200–2000 BCE

Excavated at Jericho (now in the West Bank, western Asia), this skull has a cluster of holes made by trepanning. The holes are circular, showing that the surgeon used a drill—incisions made by a knife are usually square or irregular in shape.

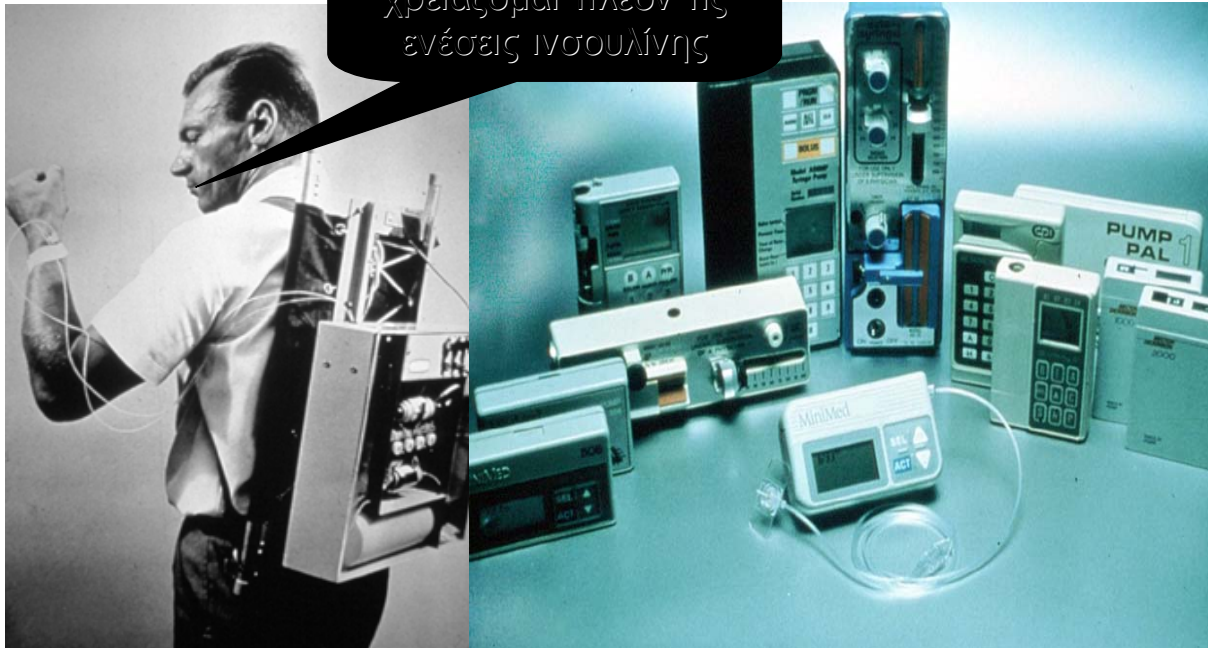


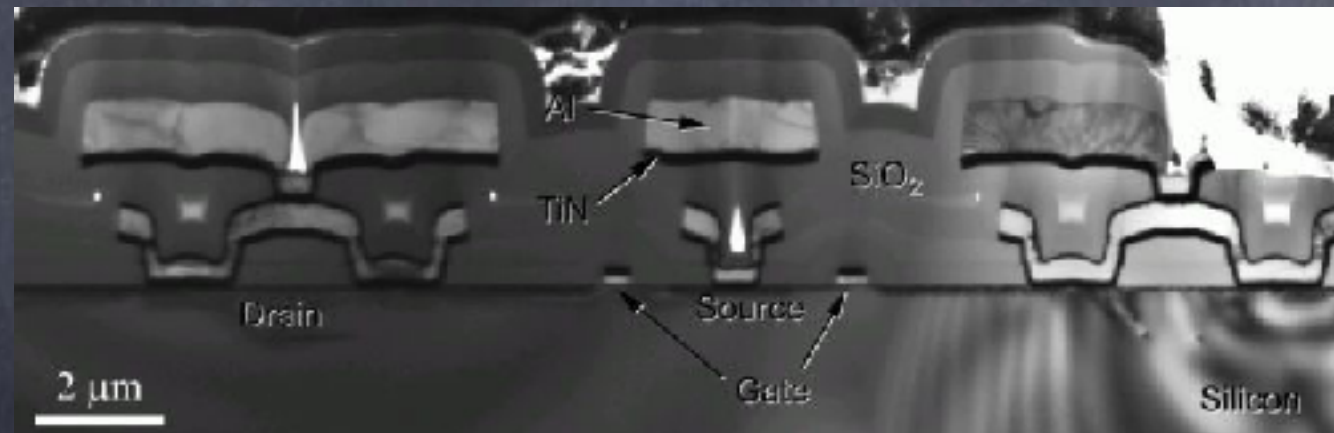
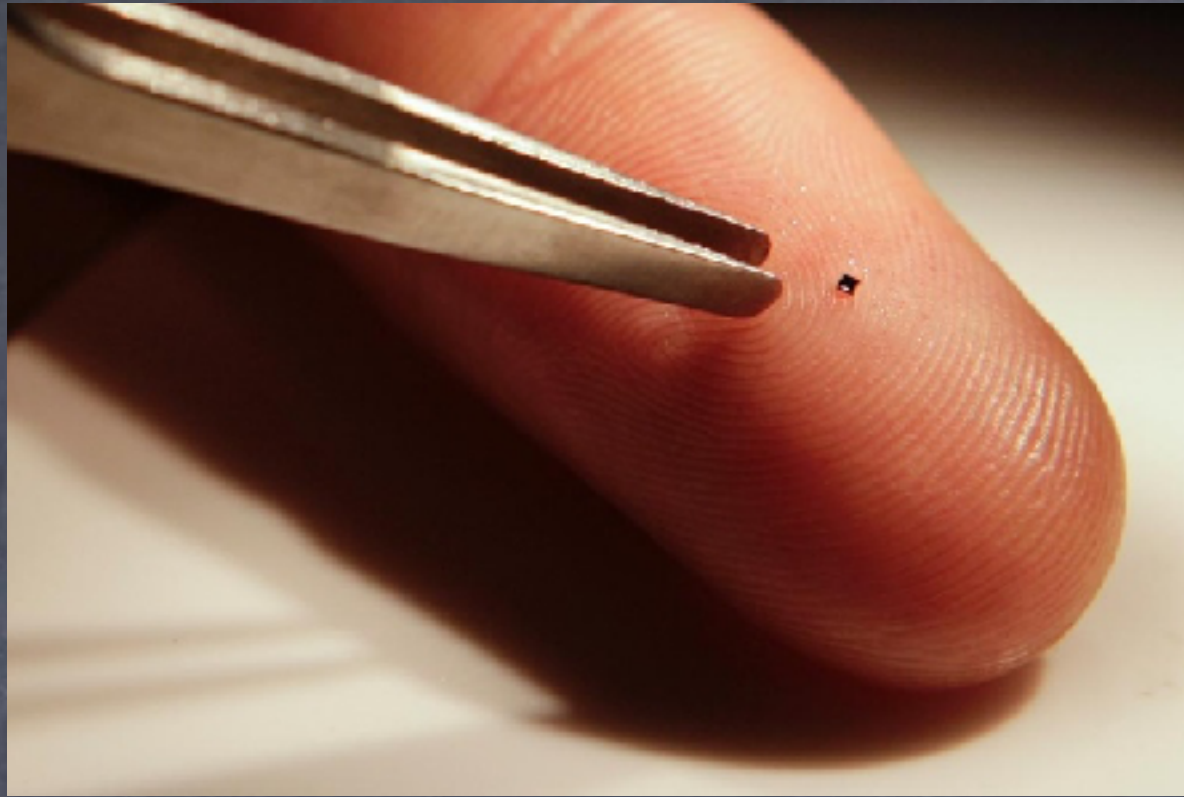
**PROSTHETIC BIG TOE OF WOOD AND LEATHER,
15TH CENTURY BCE**



Πρώτη αντλία ινσουλίνης

Επιτέλους δεν
χρειάζομαι πλέον τις
ενέσεις ινσουλίνης





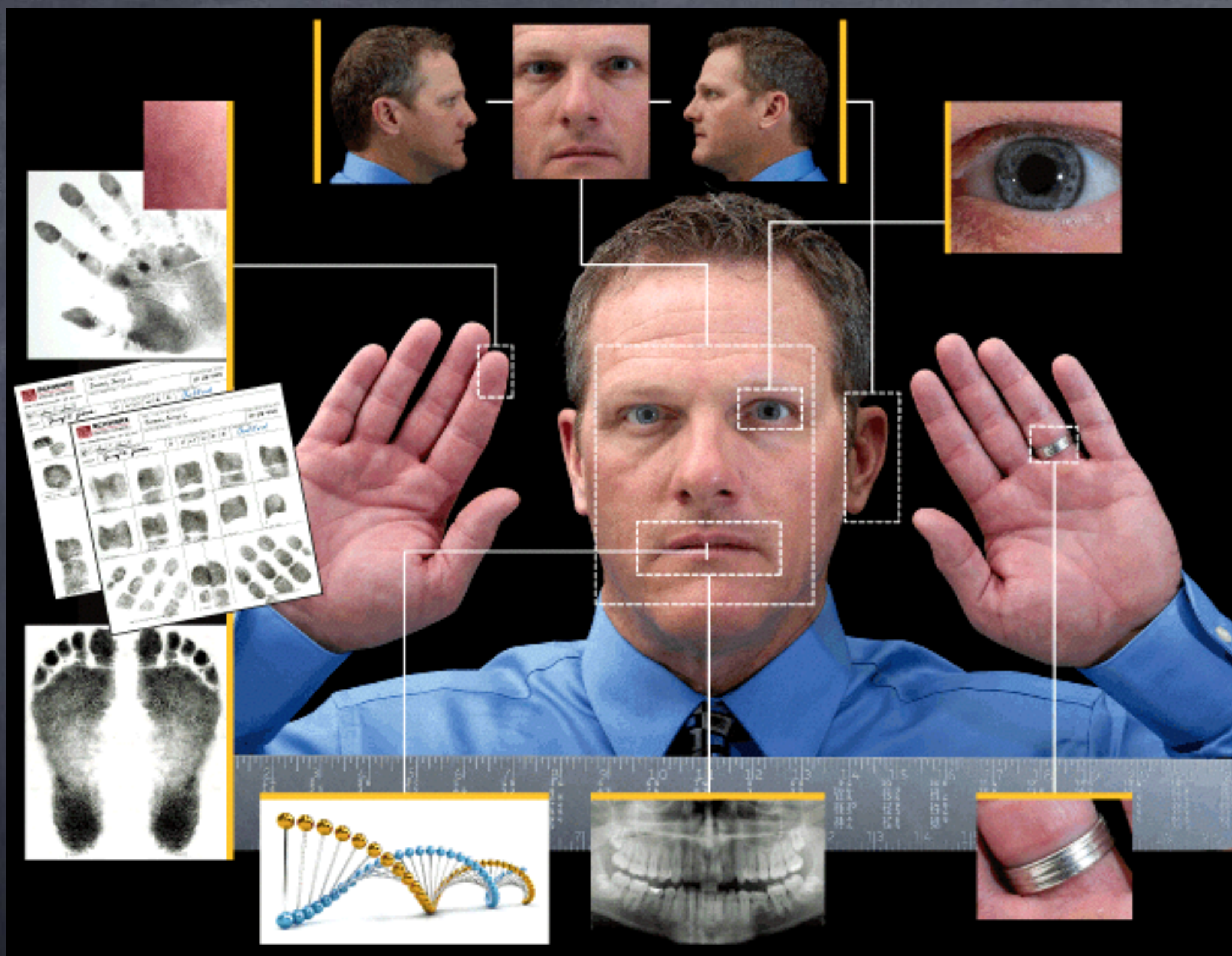
Μελέτη Περίπτωσης Ουρολιθίαση

1 στους 10 παρουσιάζει
ουρολιθίαση

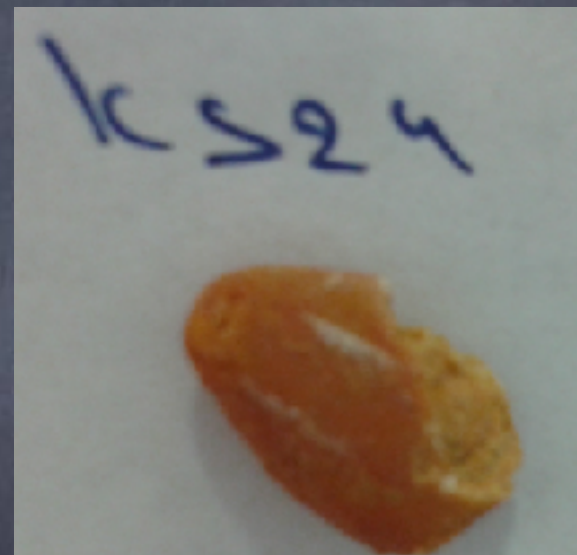
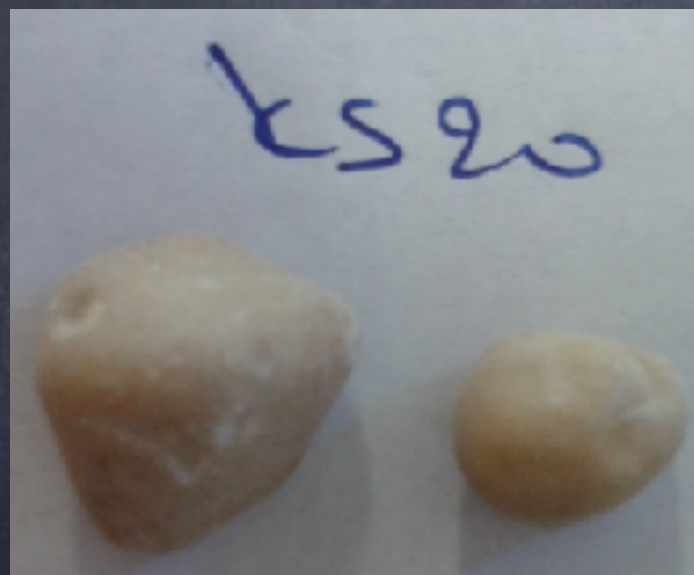
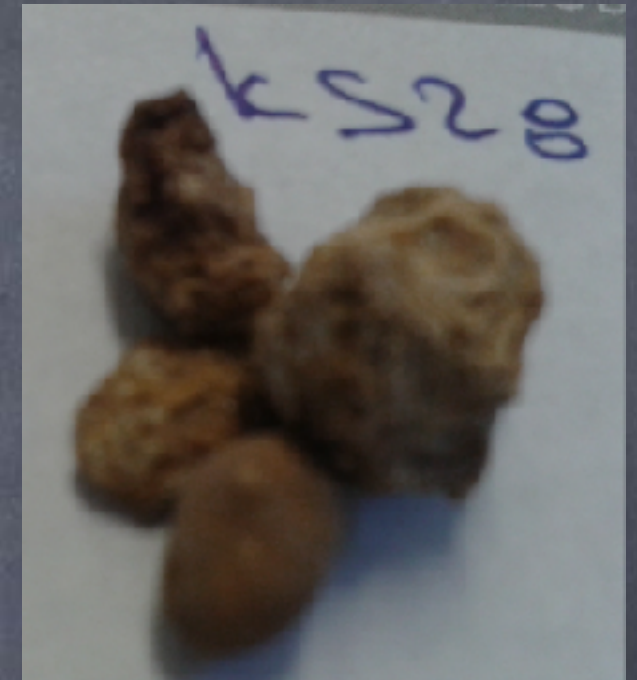
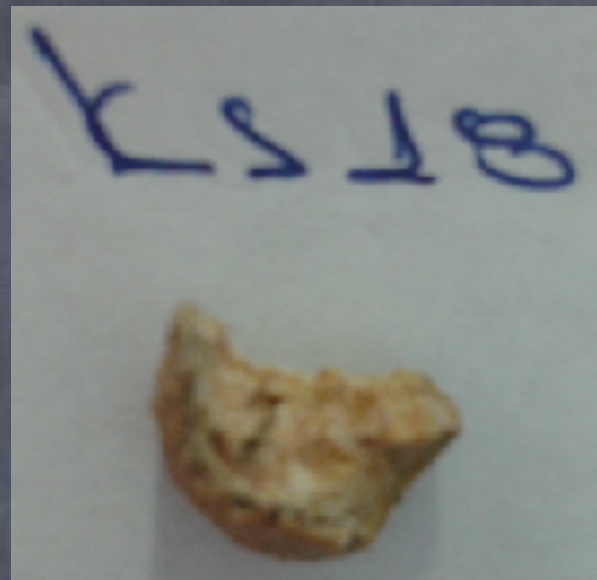
50% Εμφανίζει ξανά
λίθους

Σχετικά Υψηλό Κόστος



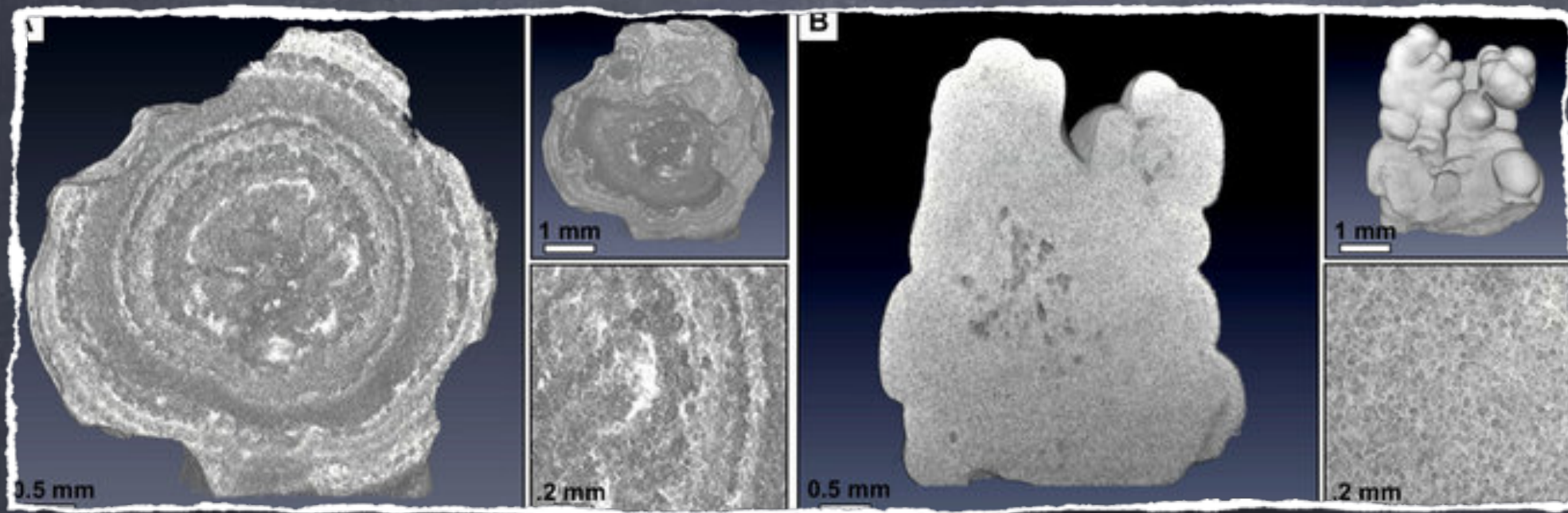


Οπτική Αναγνώριση – Μακρόκοσμος

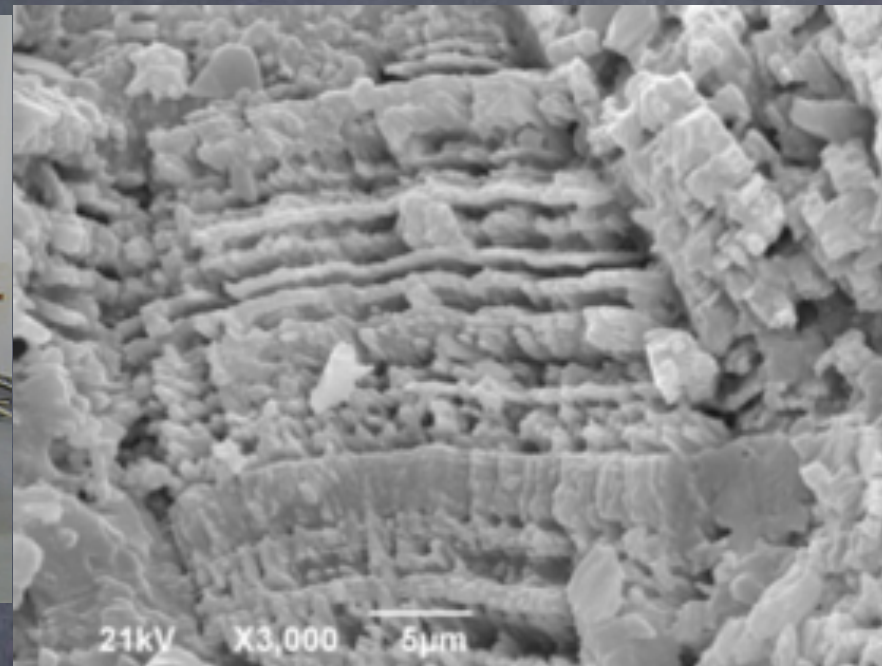


Οπτική Αναγνώριση – Μακρόκοσμο

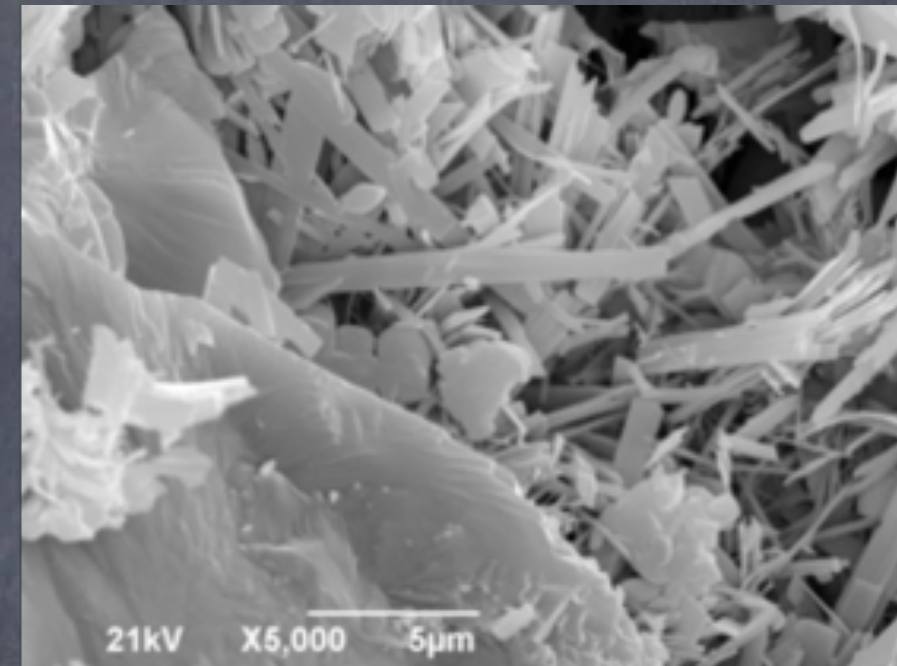
Οπτικό Μικροσκόπιο



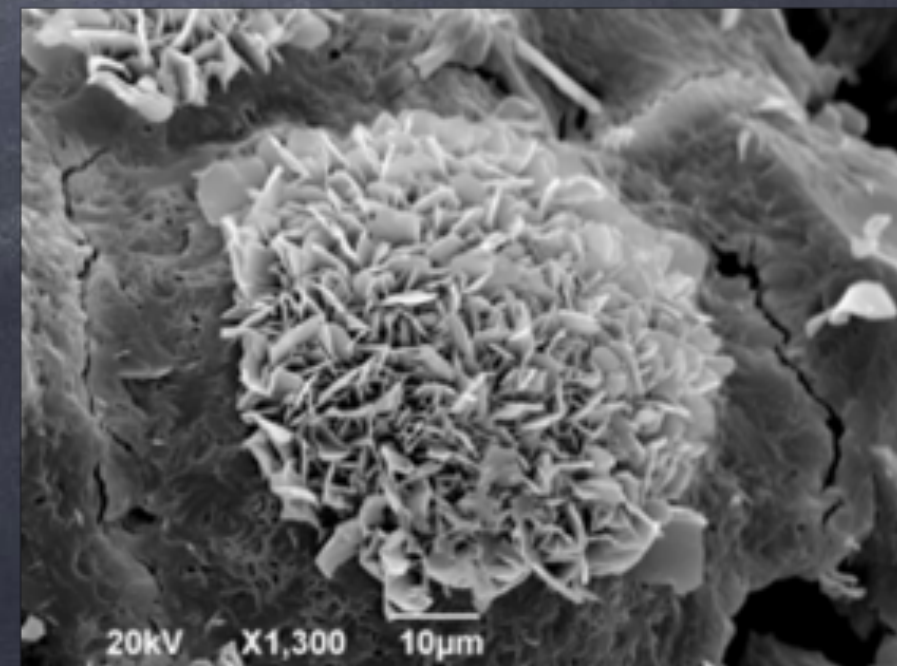
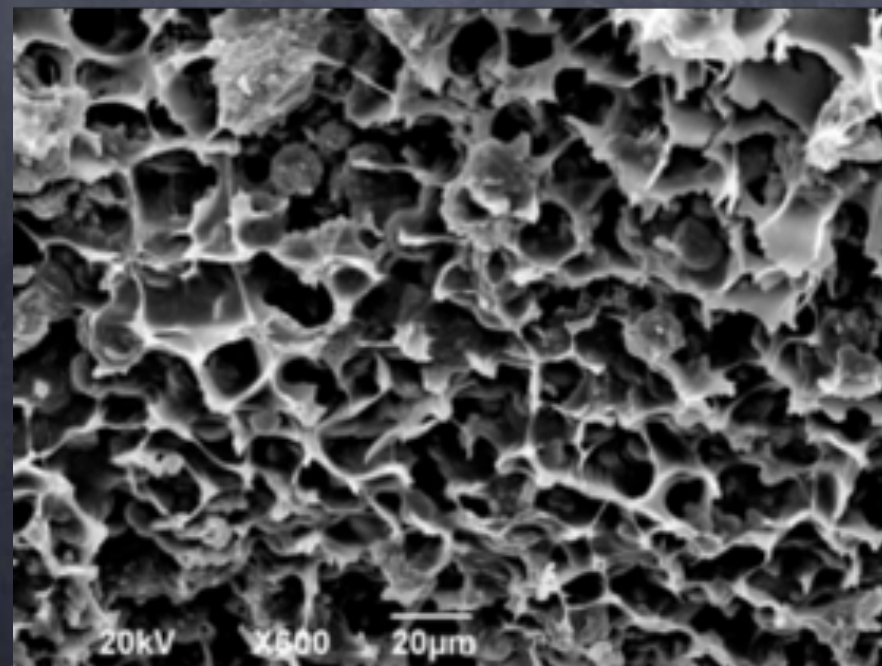
Οπτική Αναγνώριση – Μικρόκοσμος Ηλεκτρονικό Μικροσκόπιο



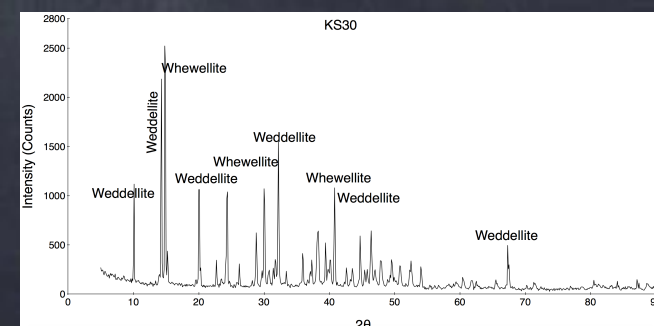
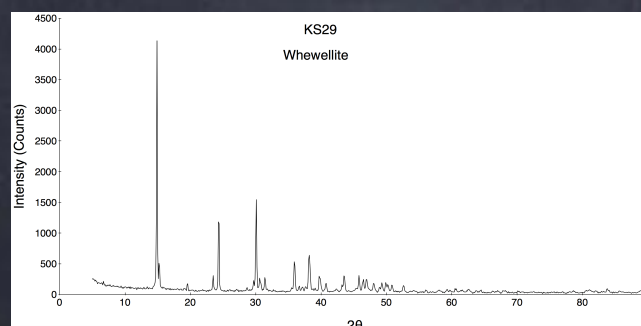
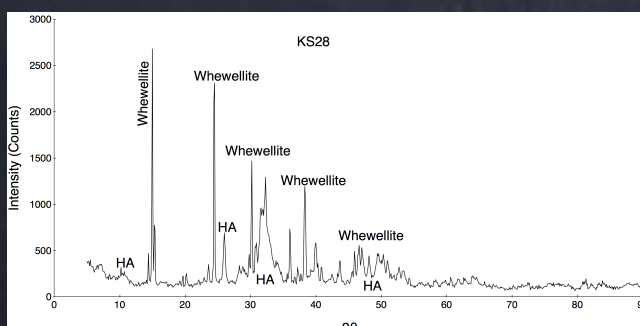
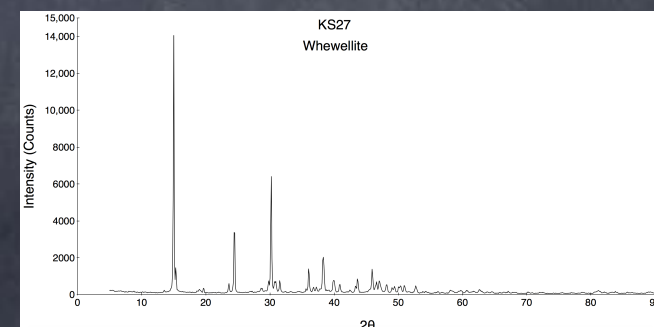
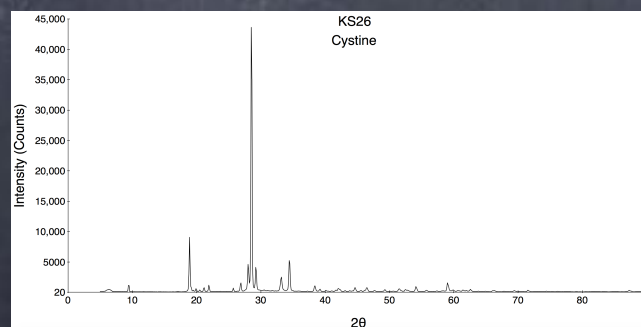
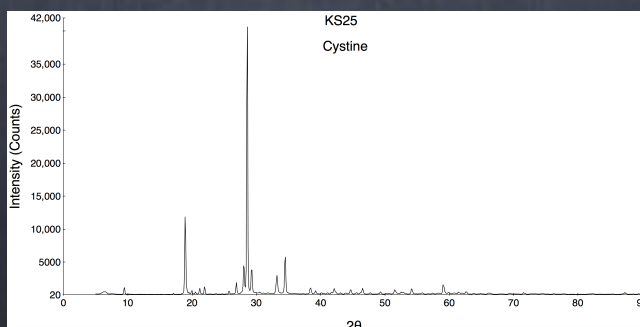
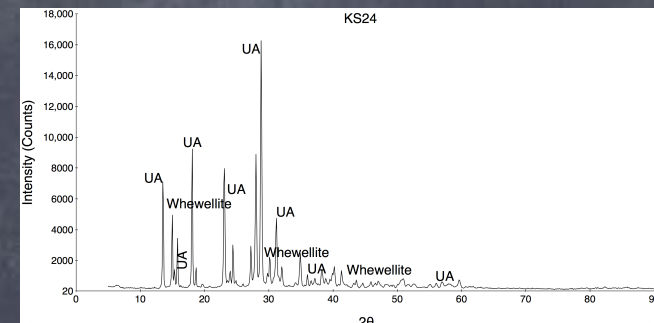
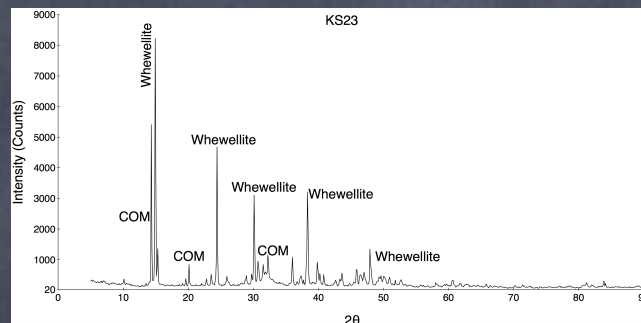
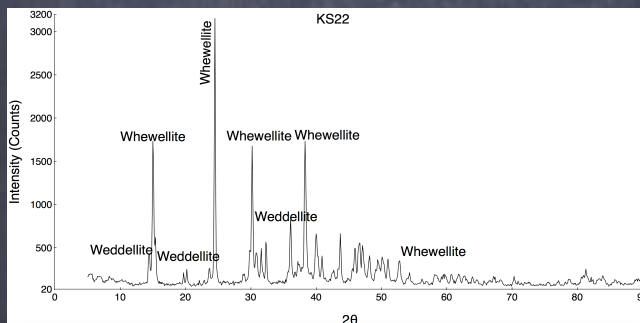
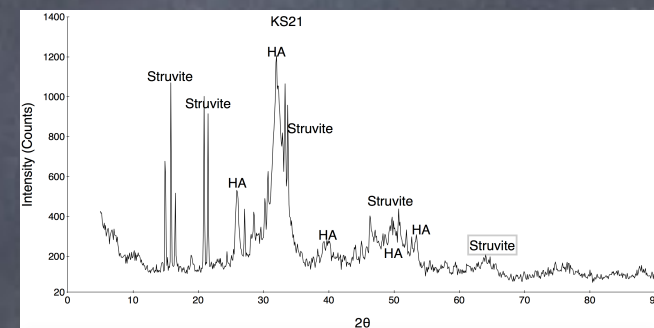
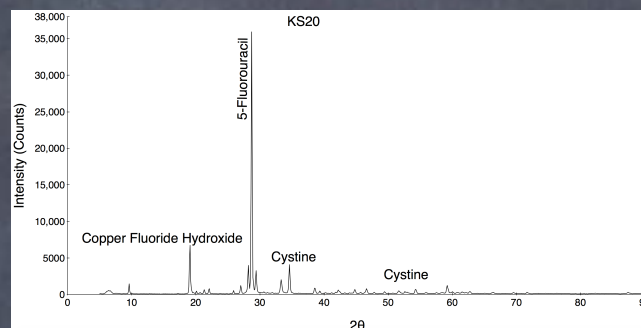
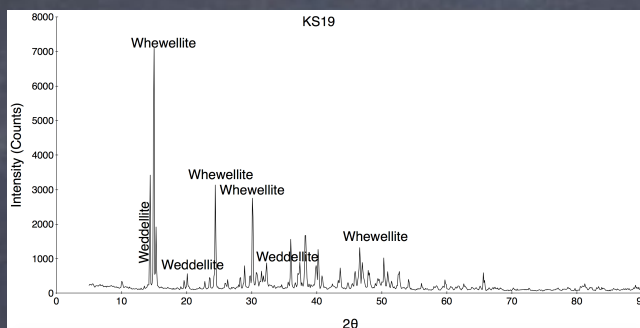
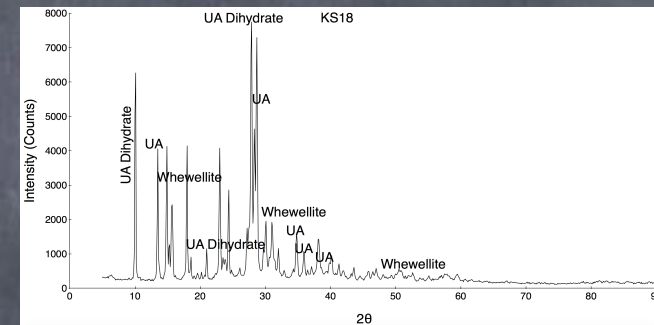
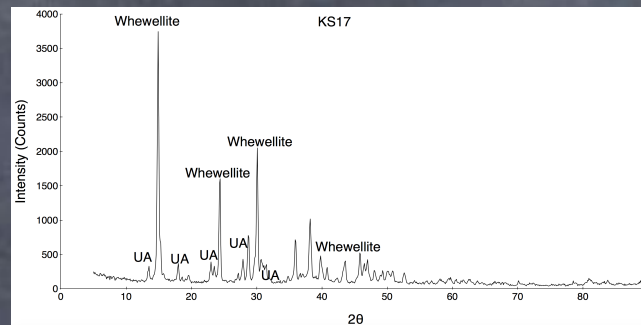
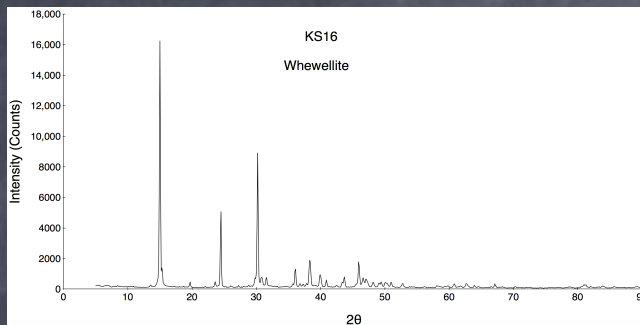
a)



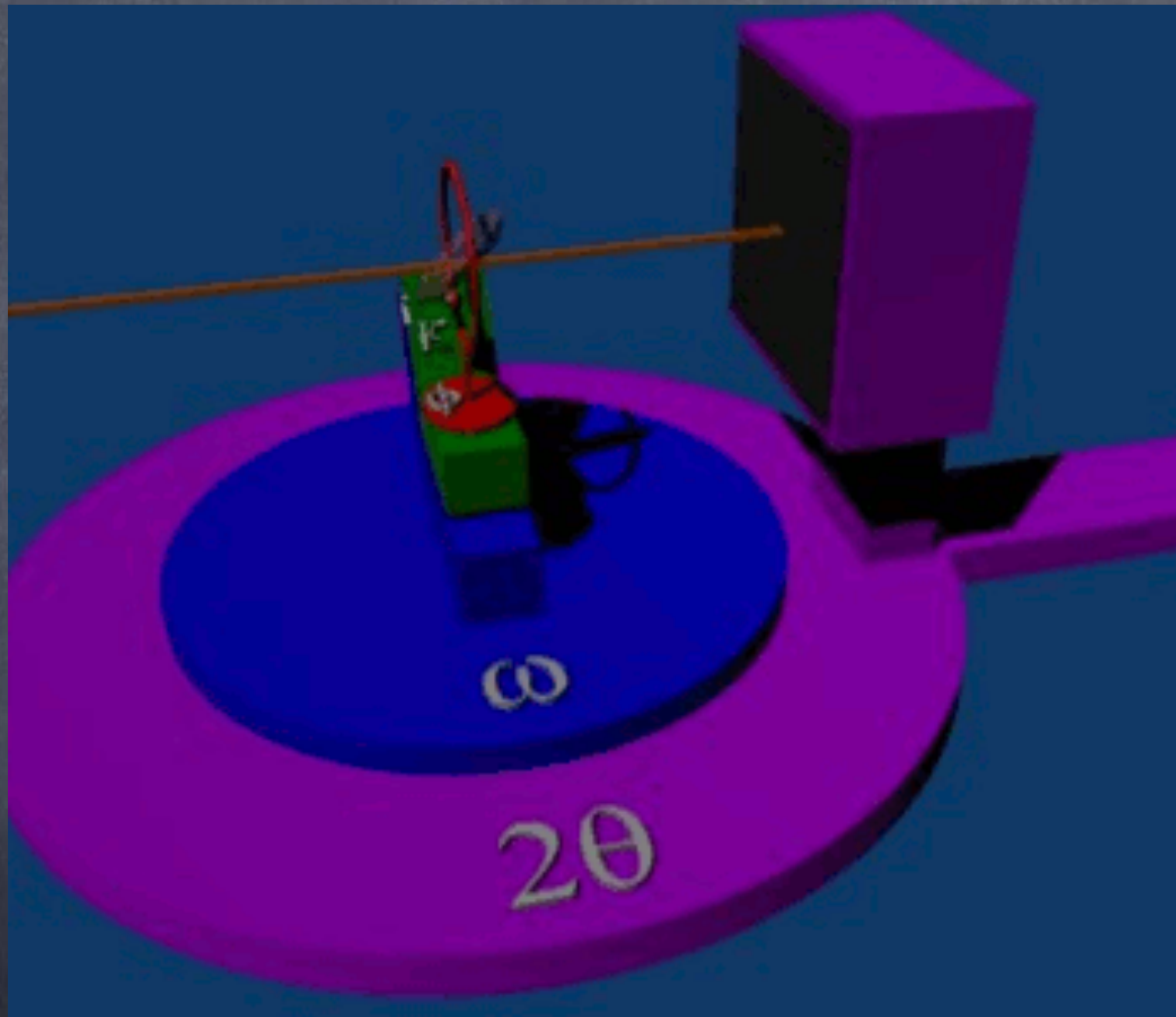
b)



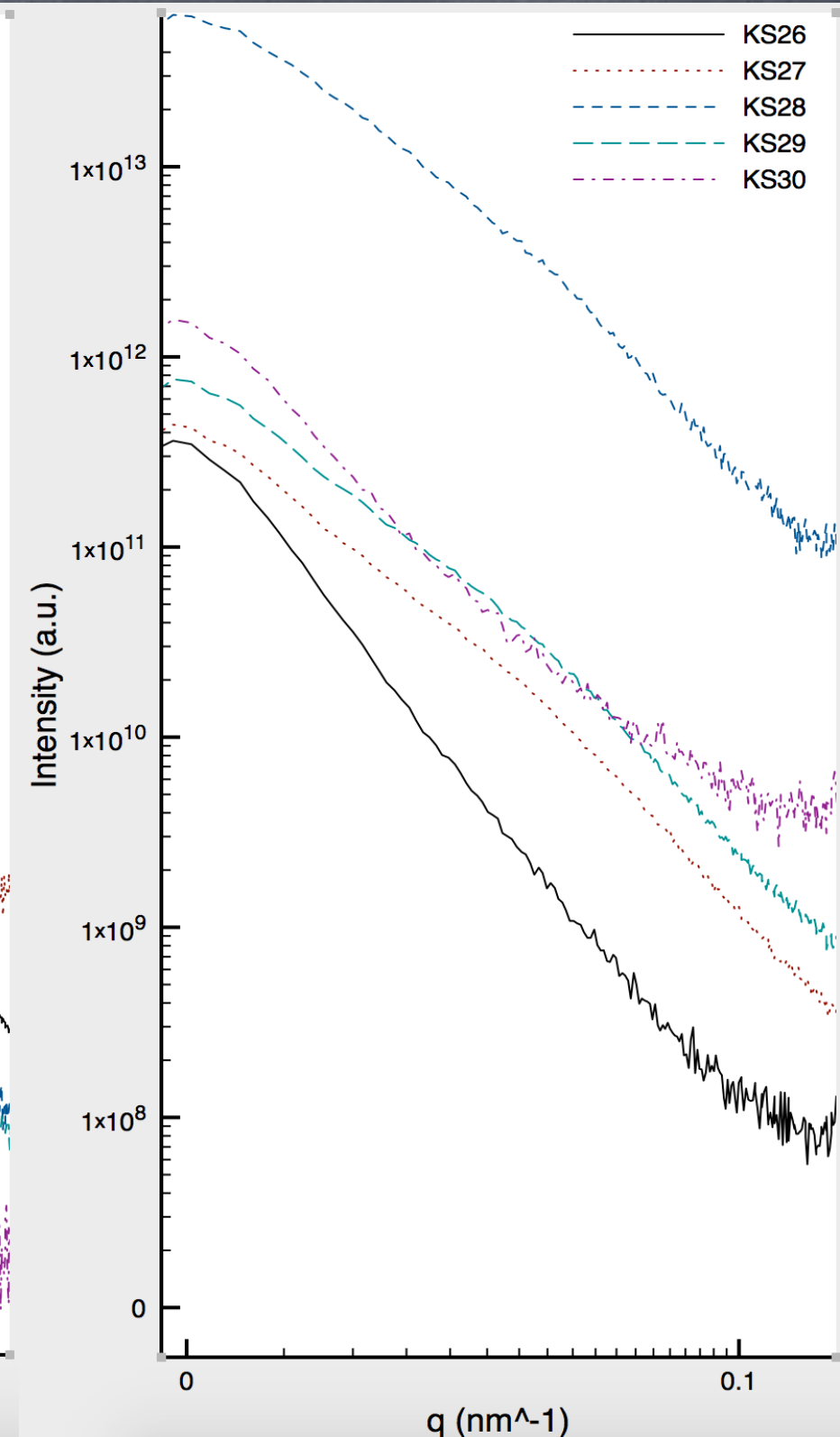
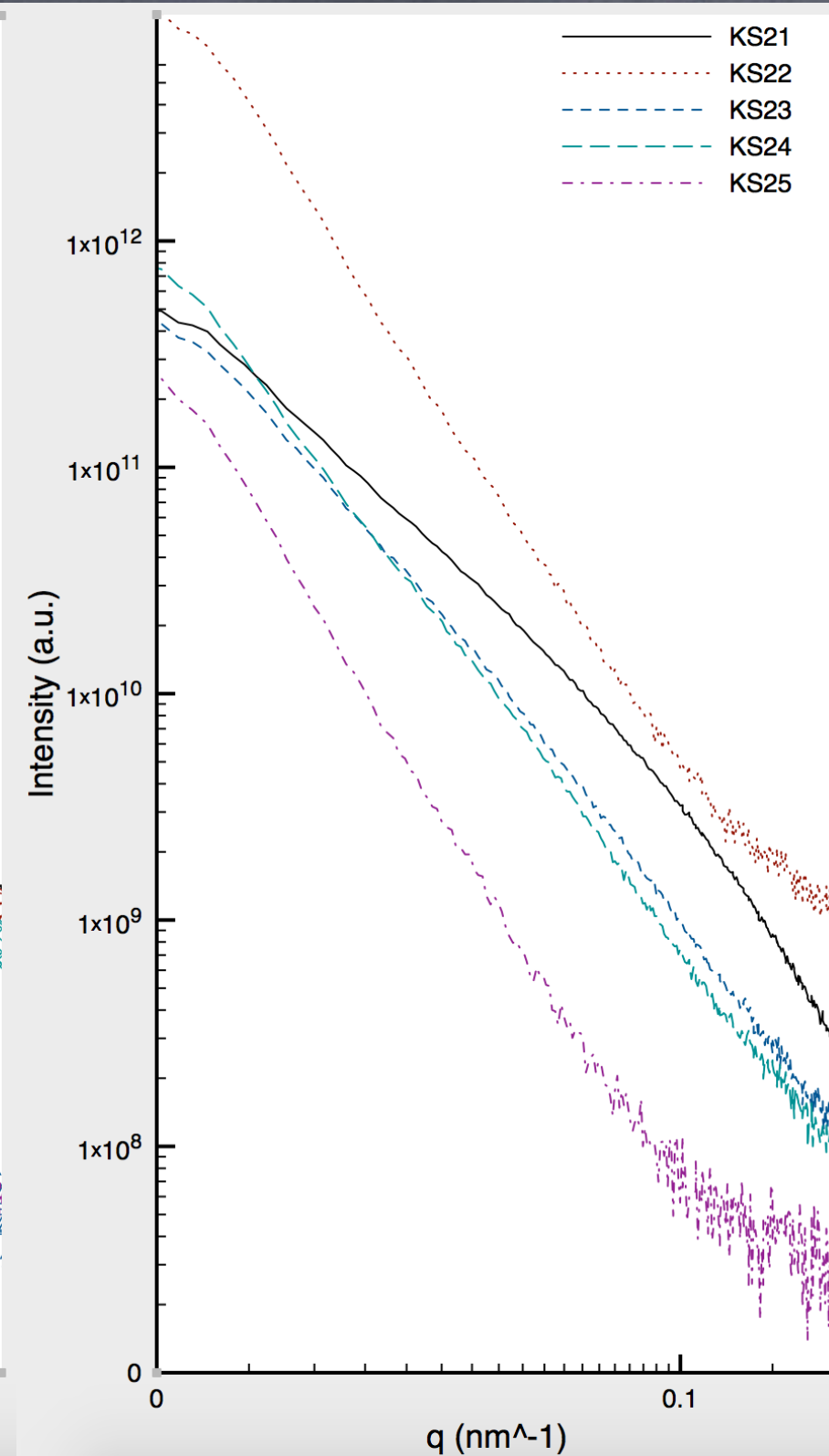
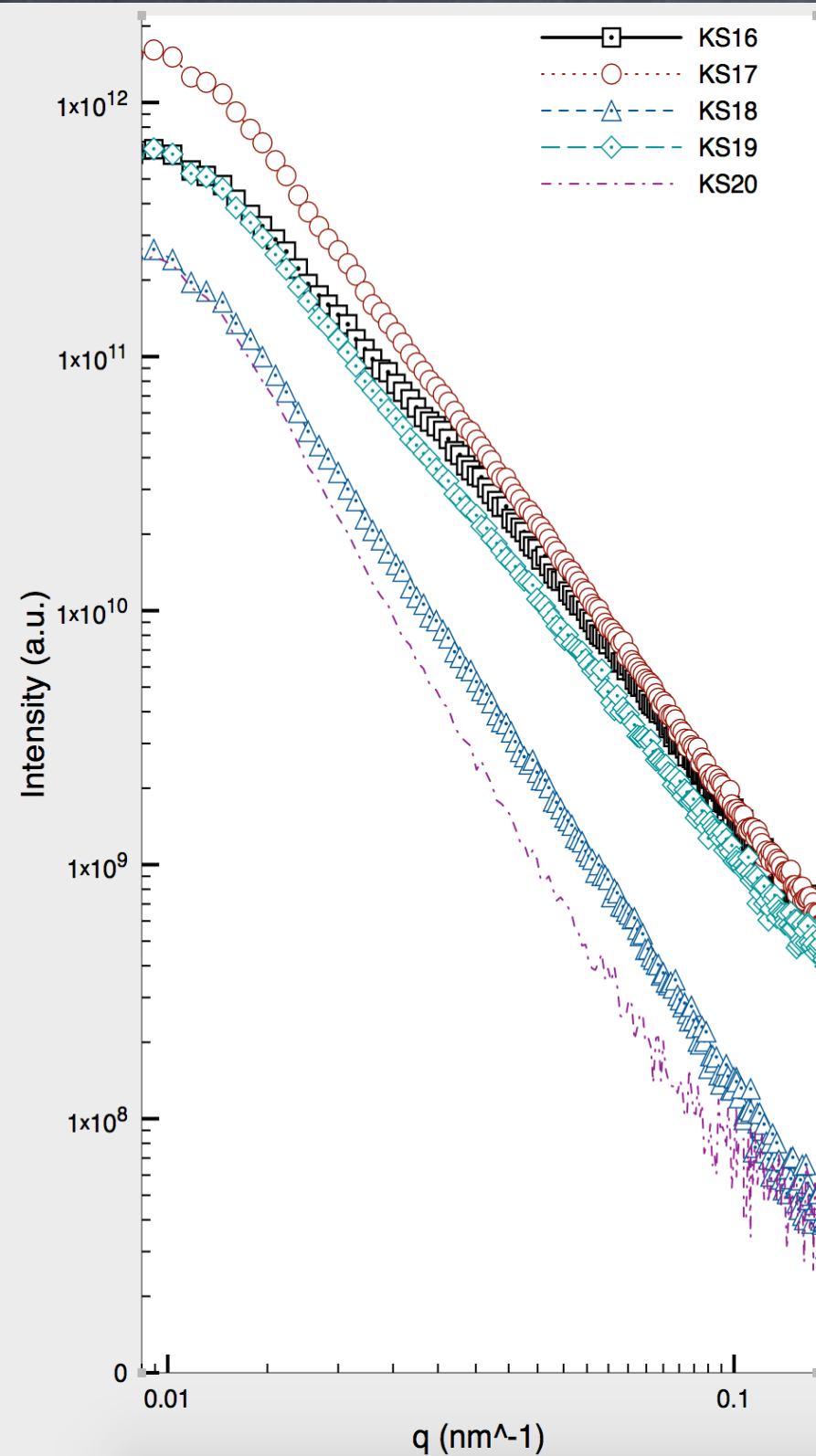
Νανοκοσμος XRD



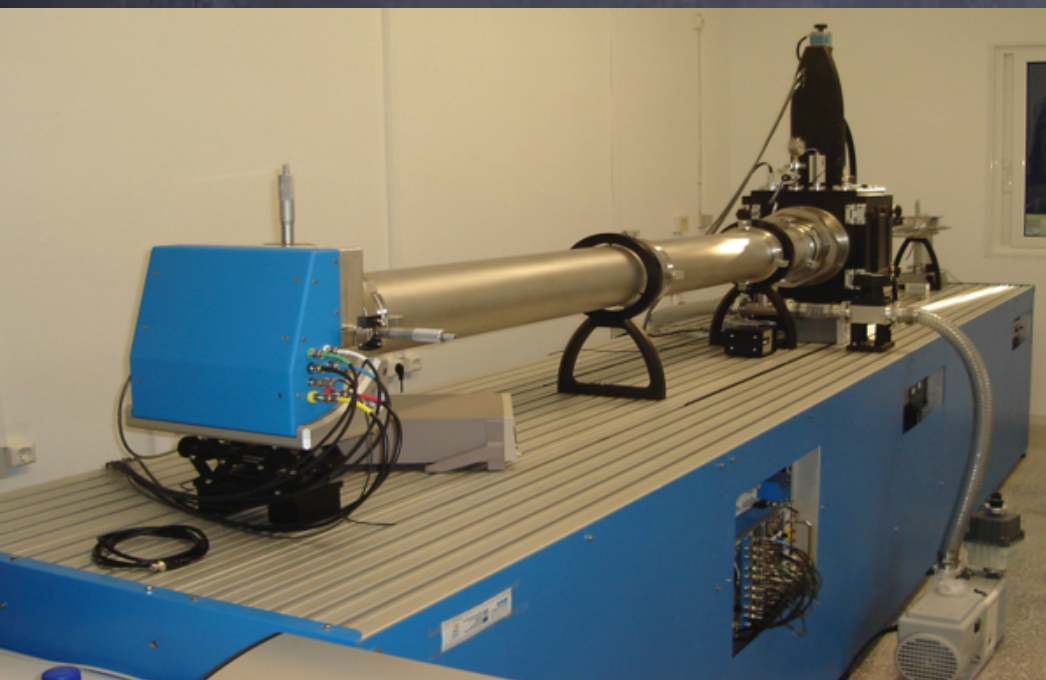
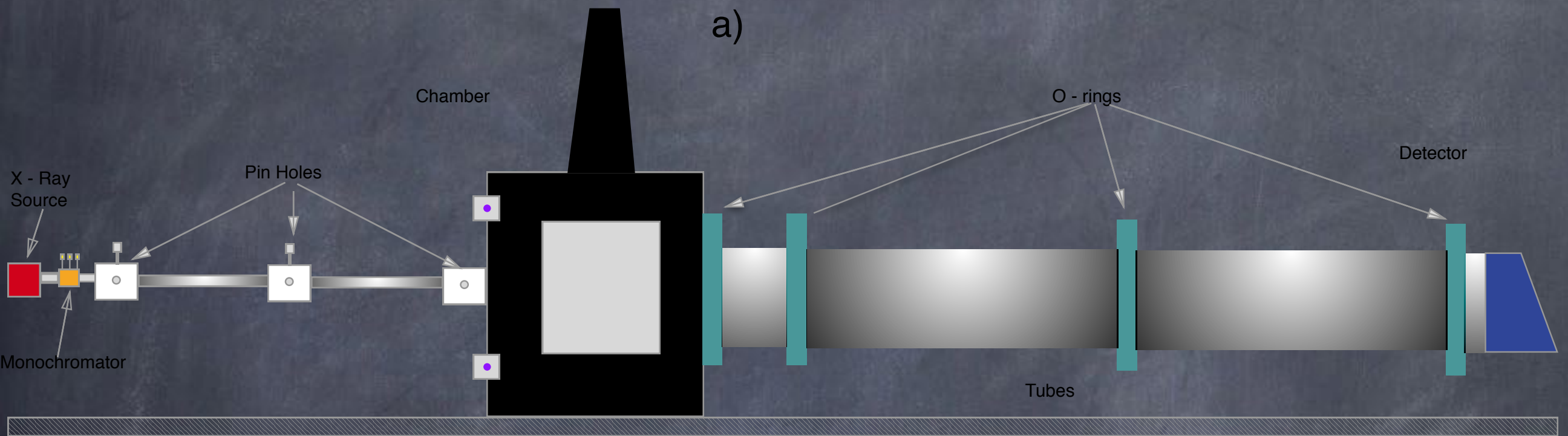
Νανοκοσμος XRD



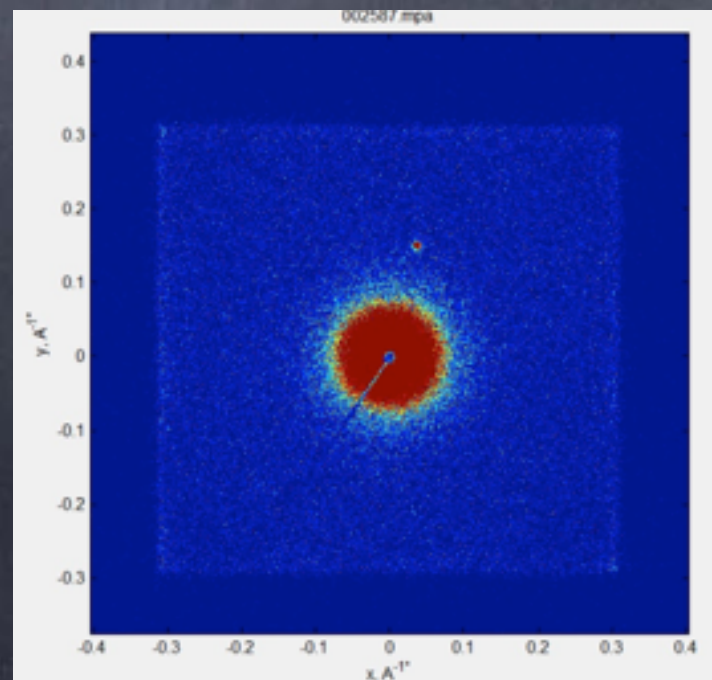
Νανοκοσμος SAXS



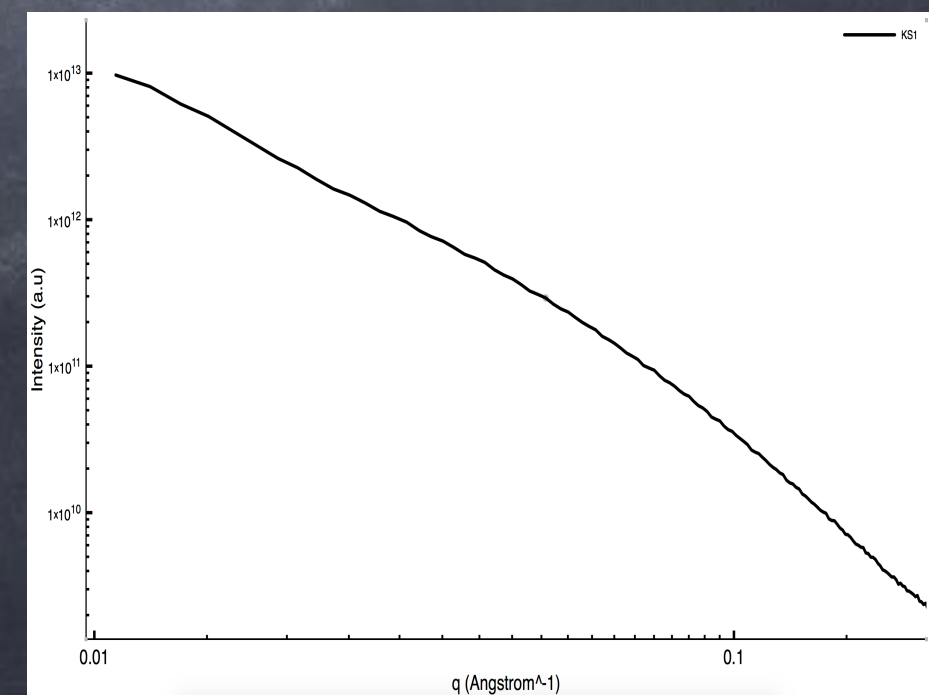
Νανοκοσμος SAXS



b)

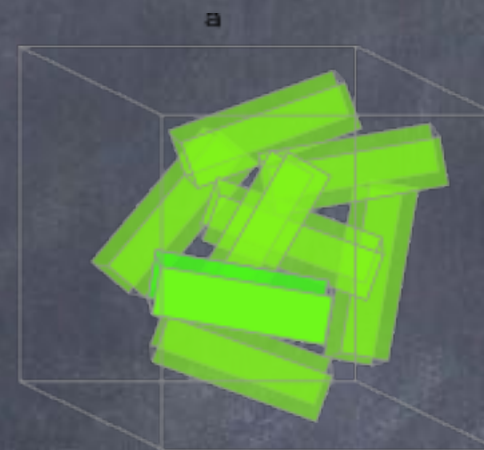
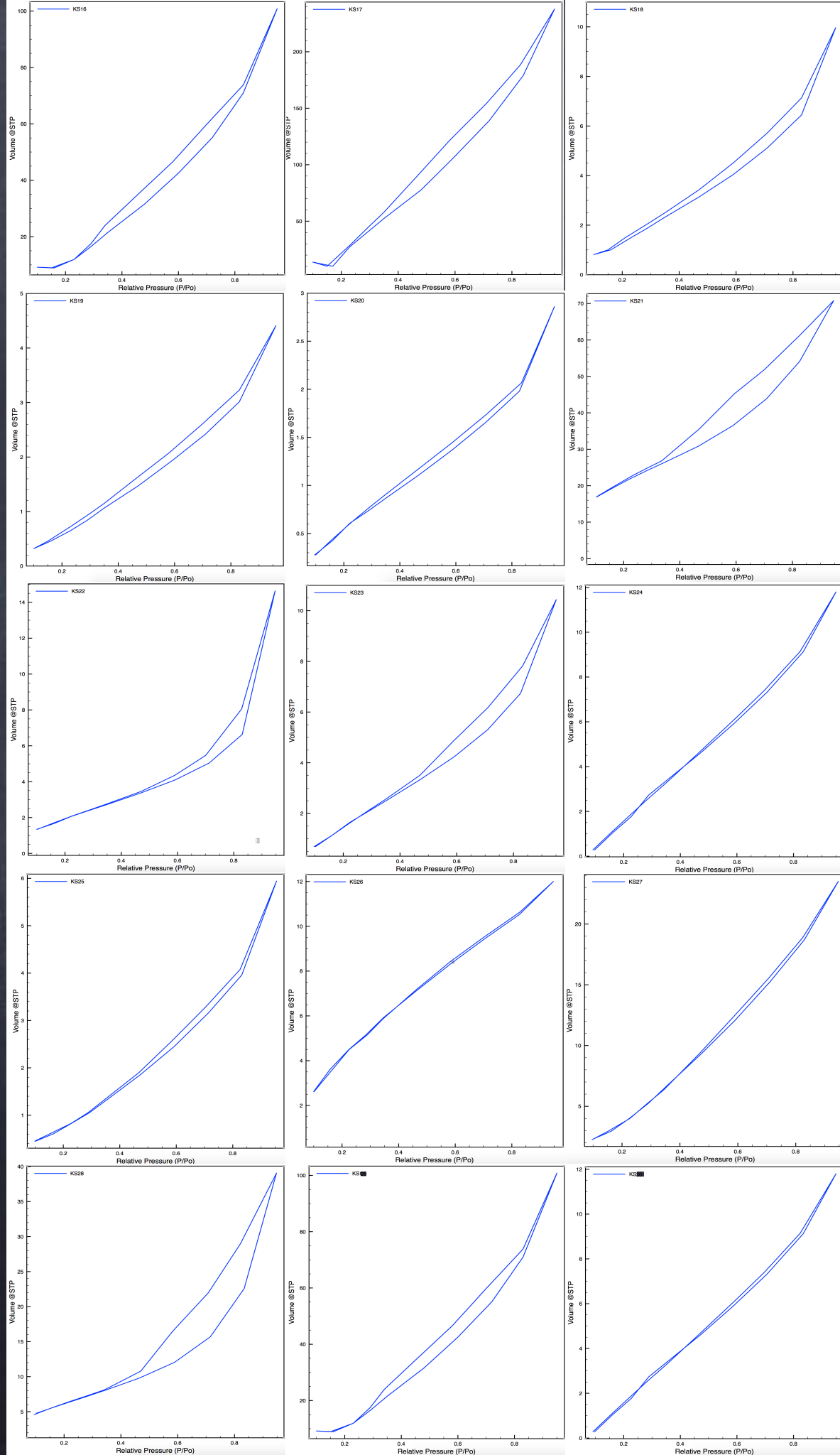


c)



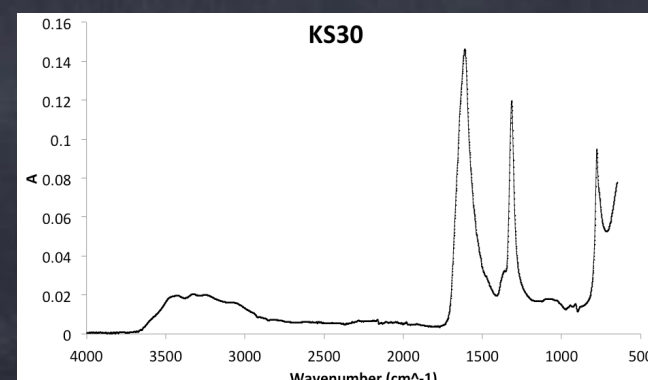
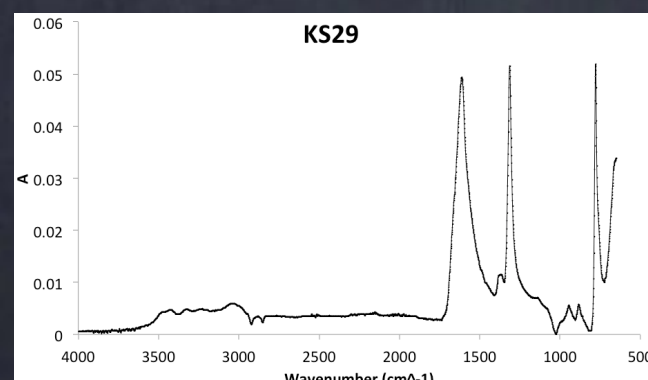
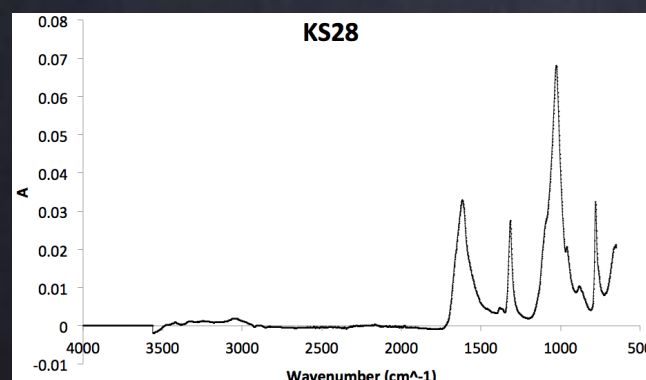
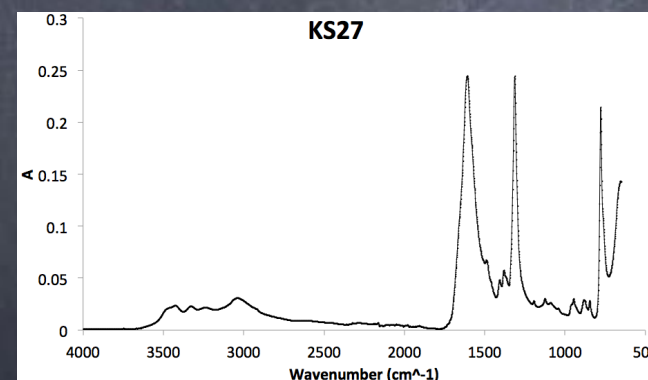
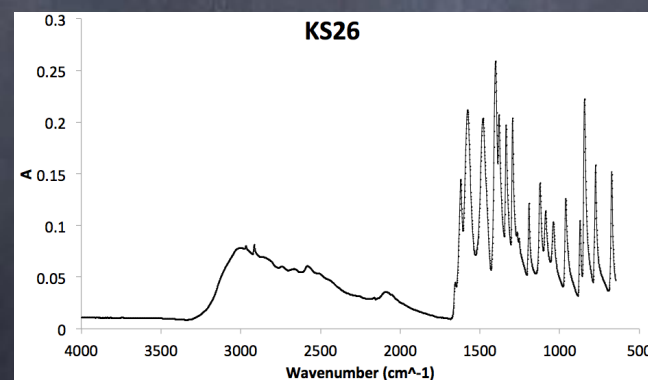
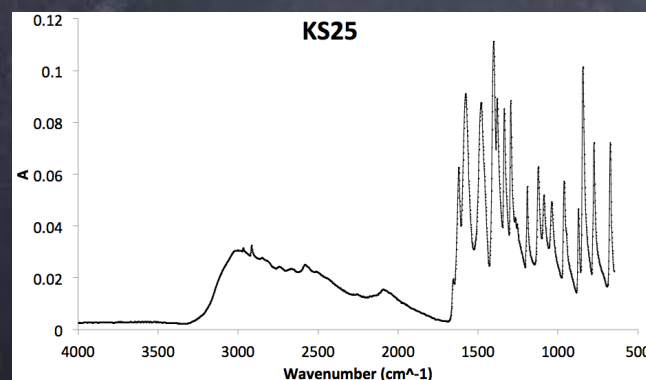
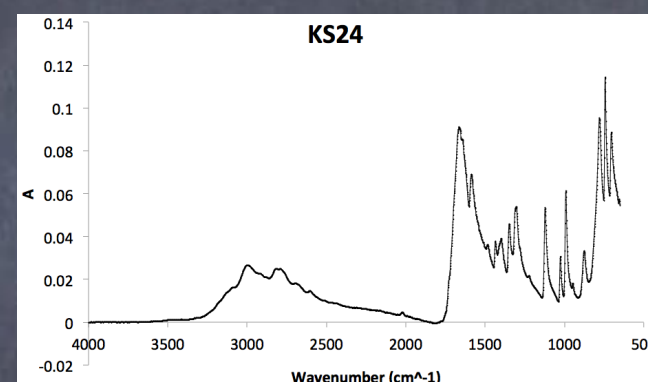
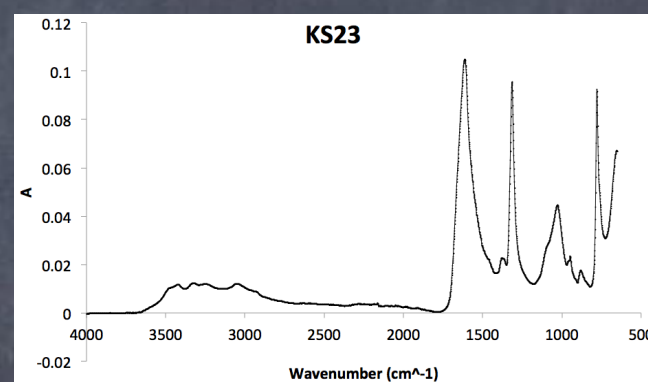
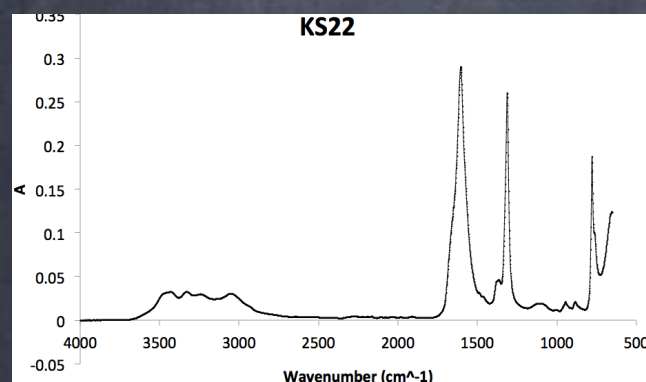
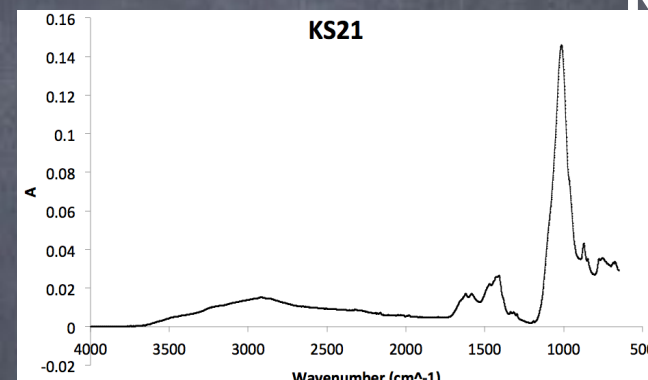
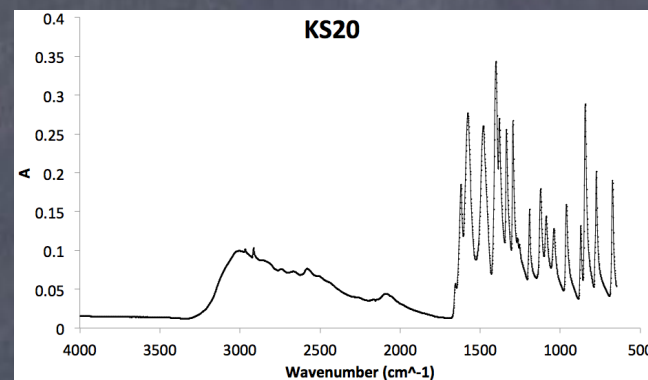
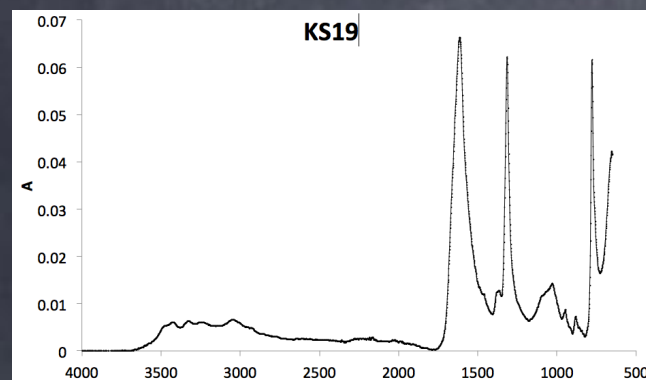
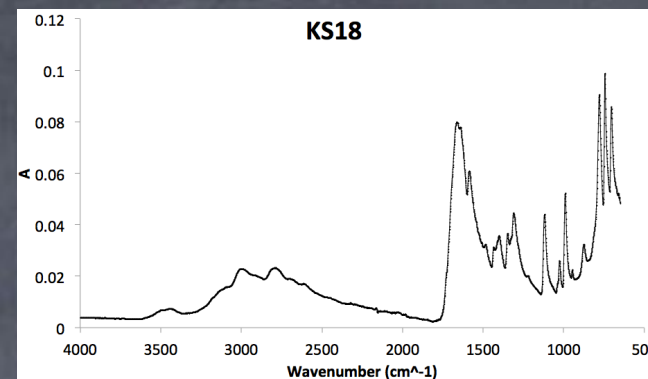
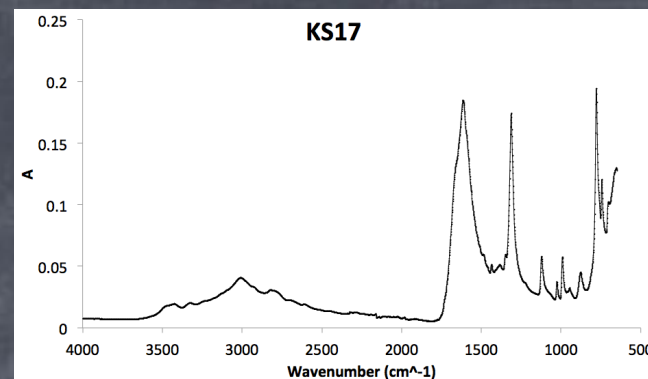
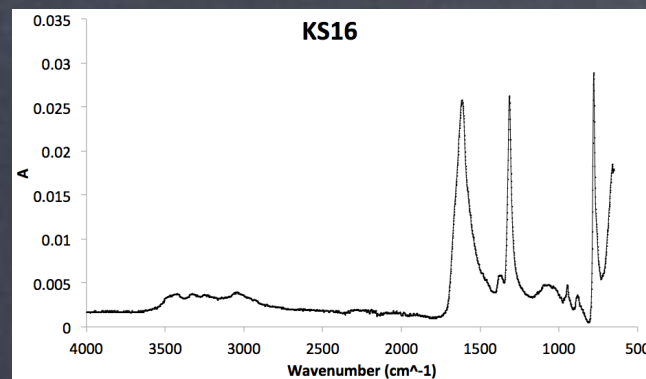
d)

Νανοκοσμος Nitrogen - Porosimetry

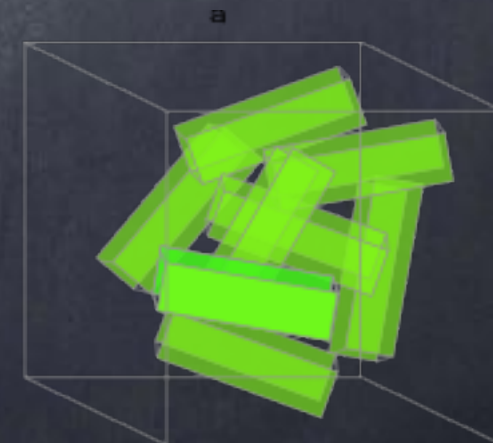


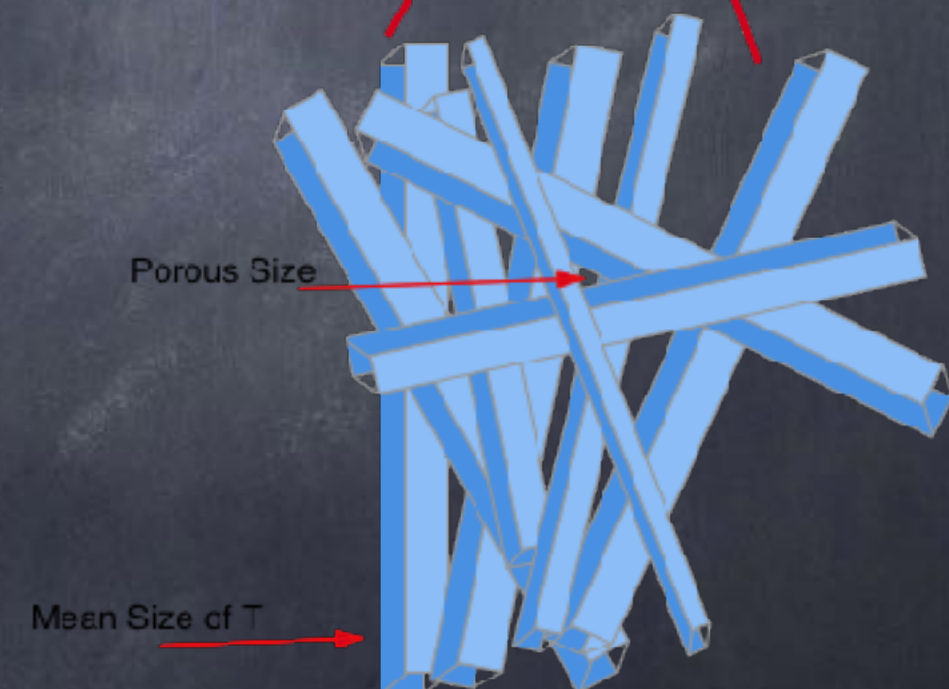
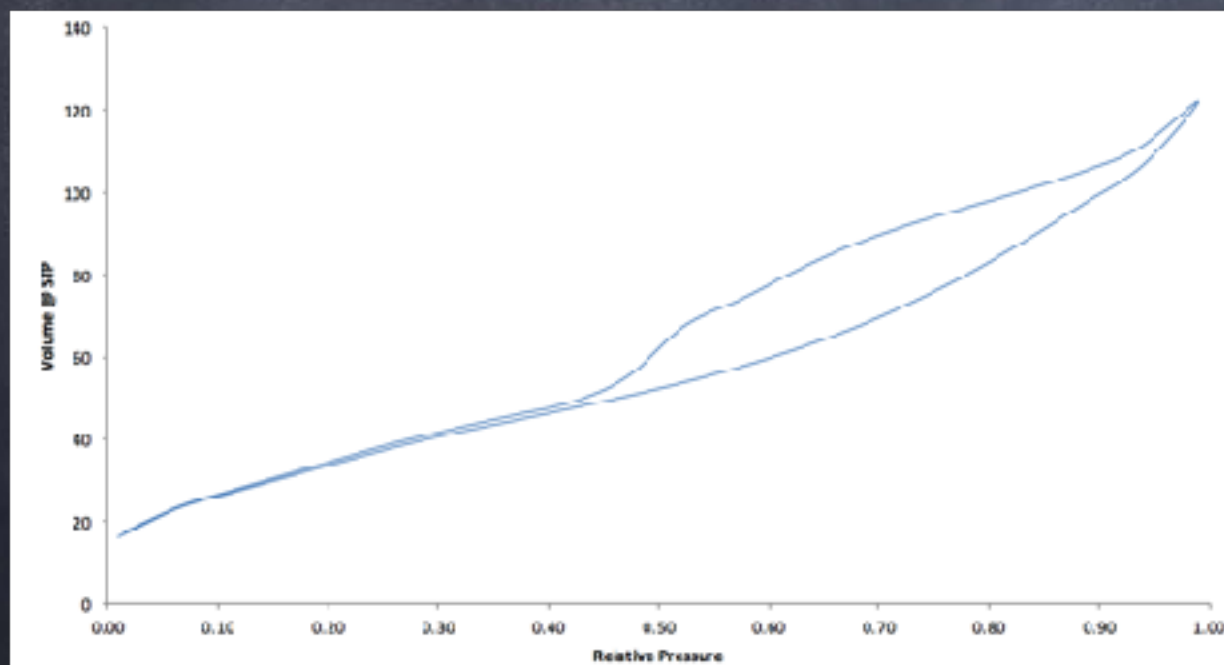
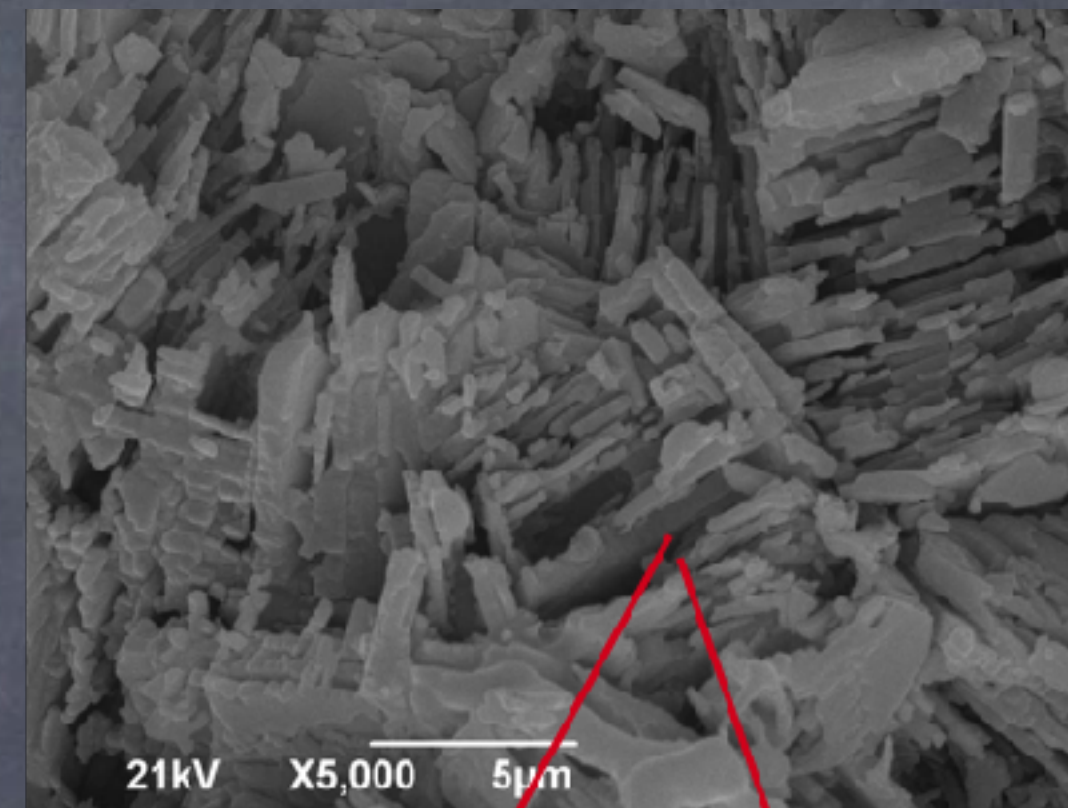
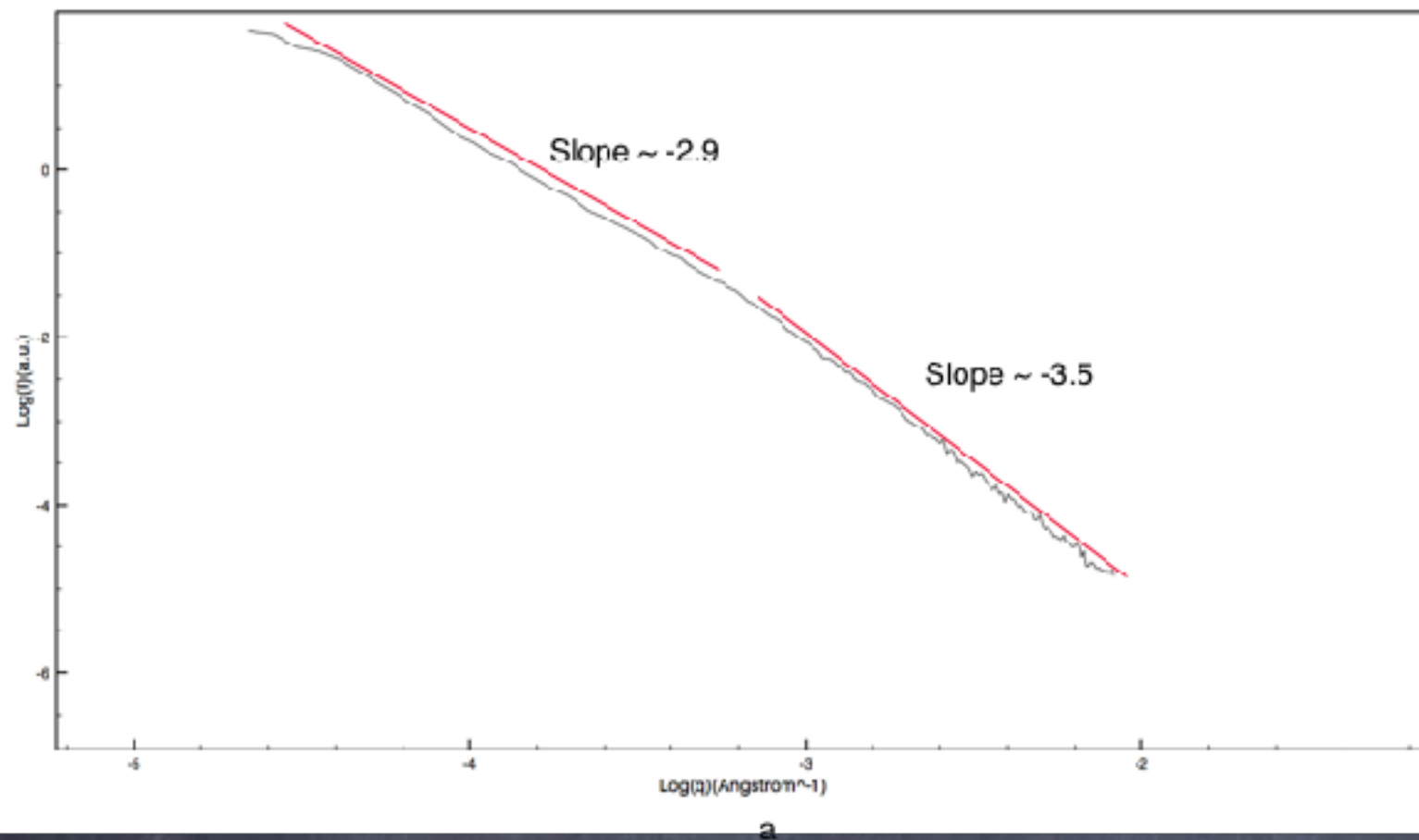
Νανοκοσμος Nitrogen – Porosimetry



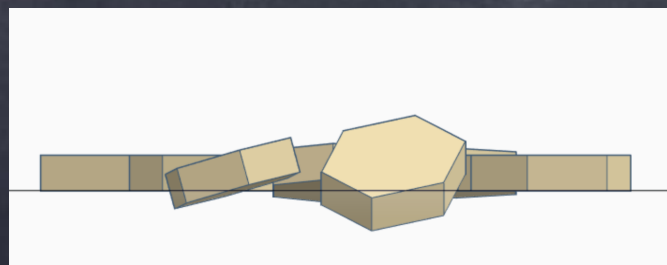
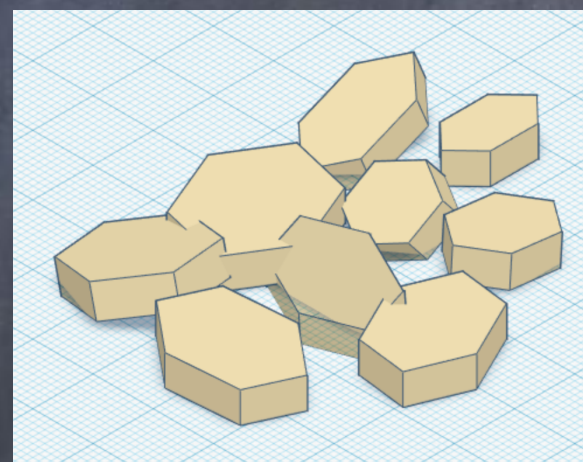
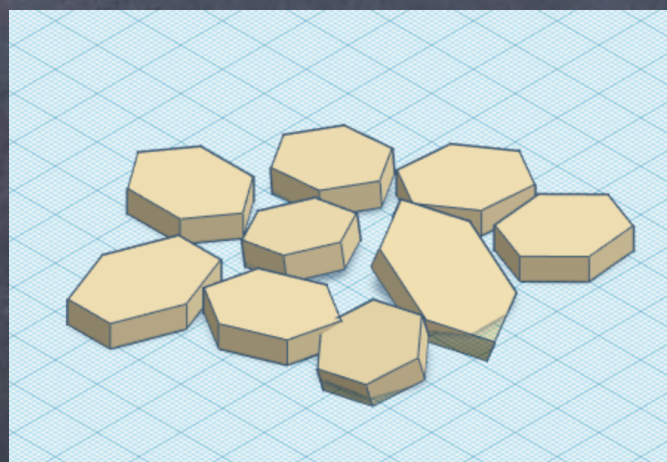
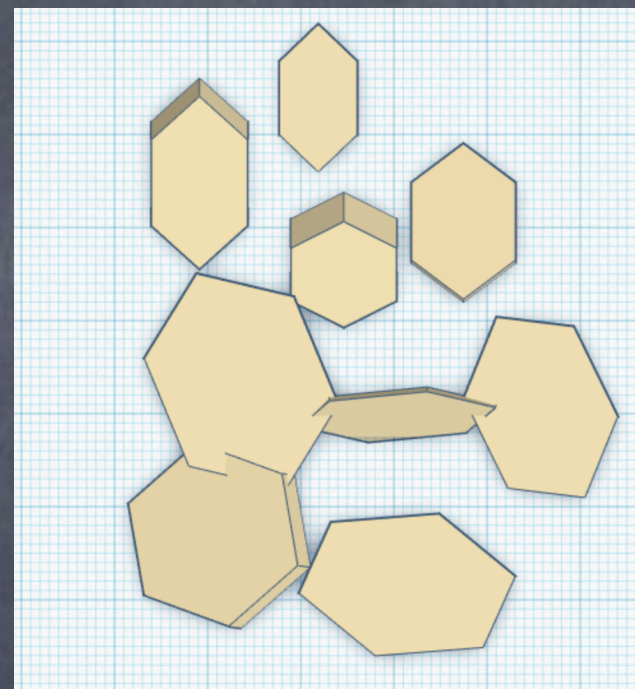
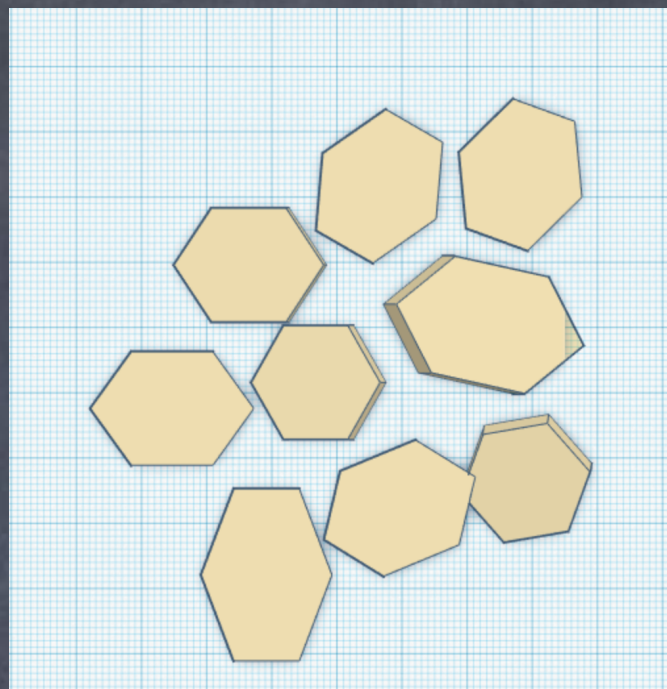


Νανοκοσμος
FTIR

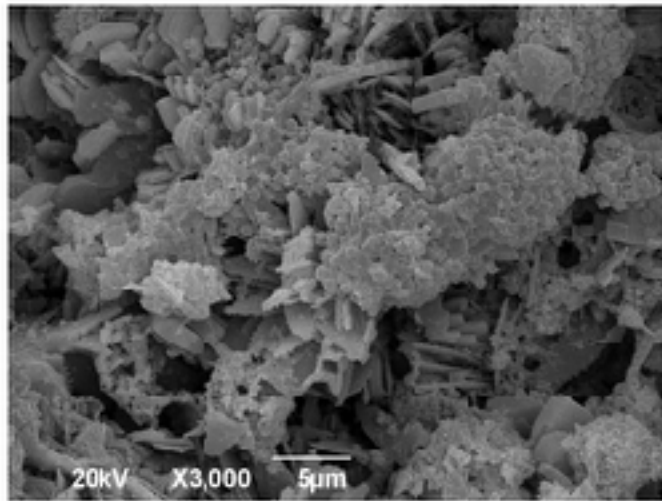




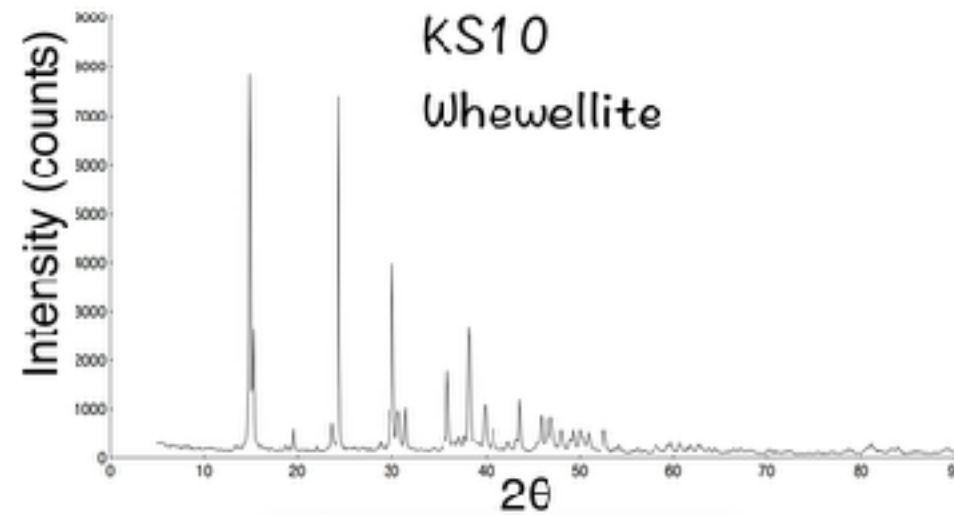
[1] N. Vordos, S. Giannakopoulos, A. C. Mitropoulos, and S. Touloupidis, "Nanostructural Characterization of Kidney Stones as a Tool for Hardness Evaluation and Nanomedicine Development," *European Urology*, Jun. 2016.



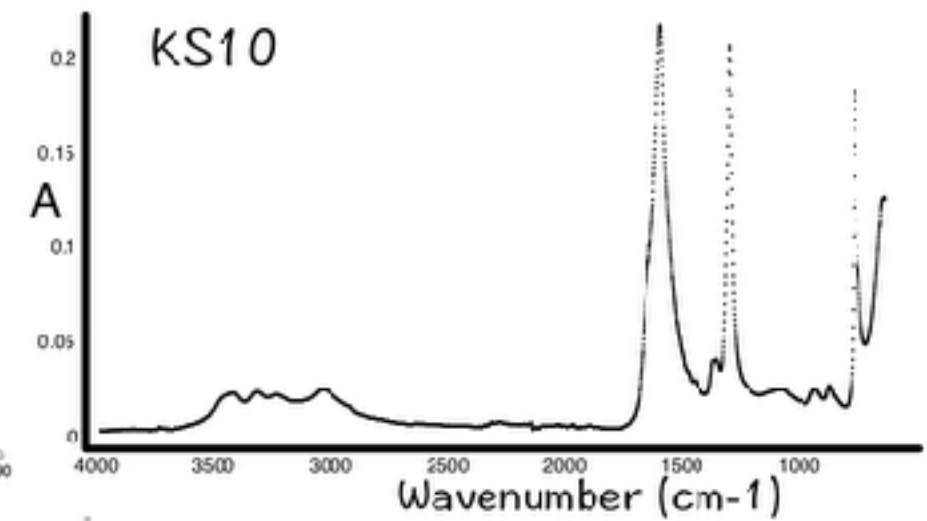
SEM



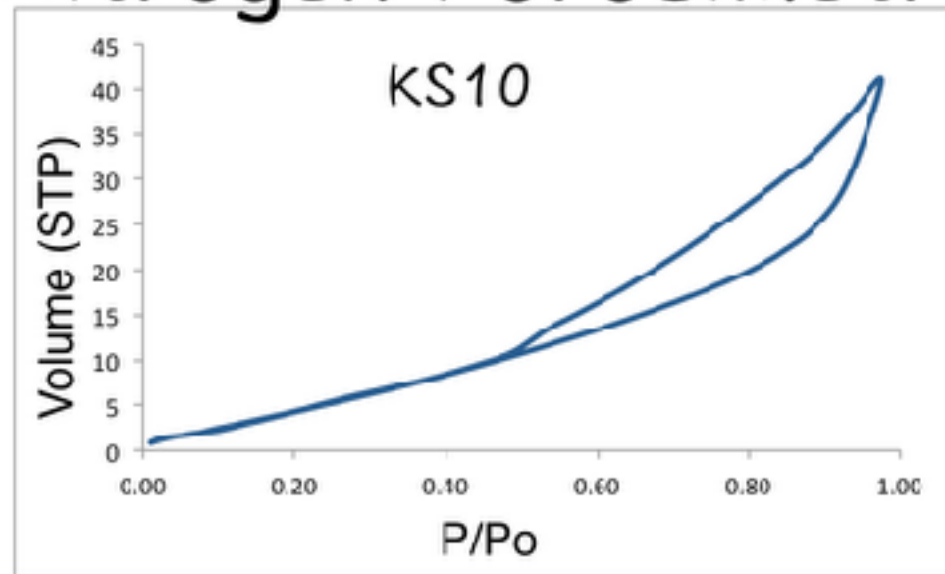
XRD



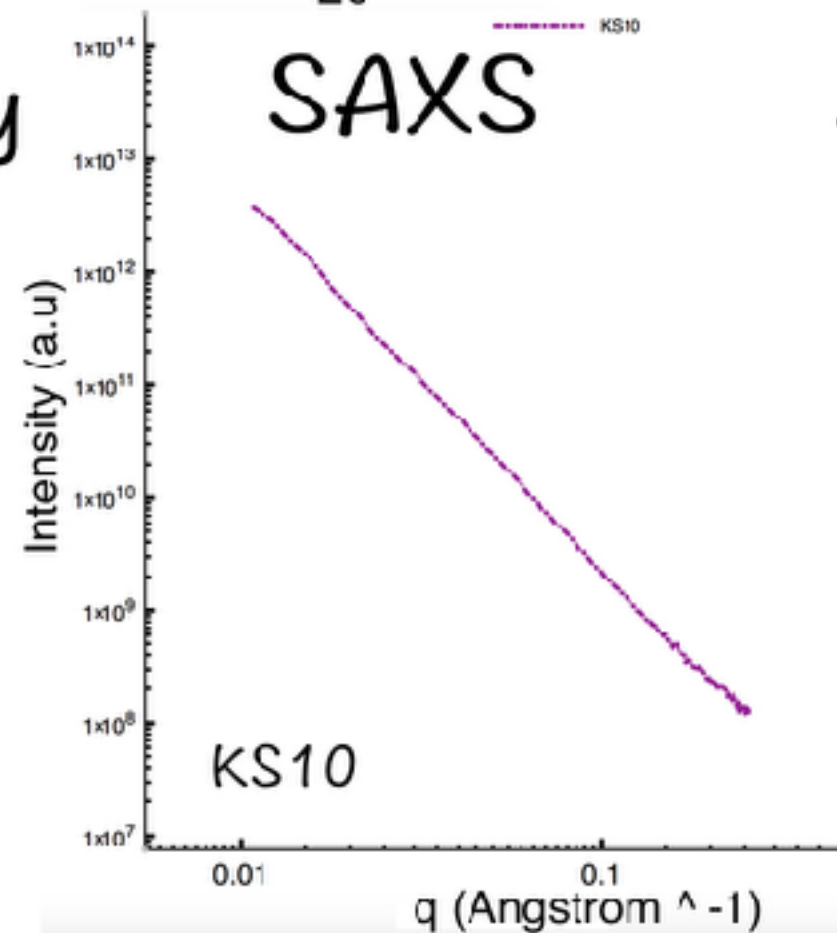
FTIR



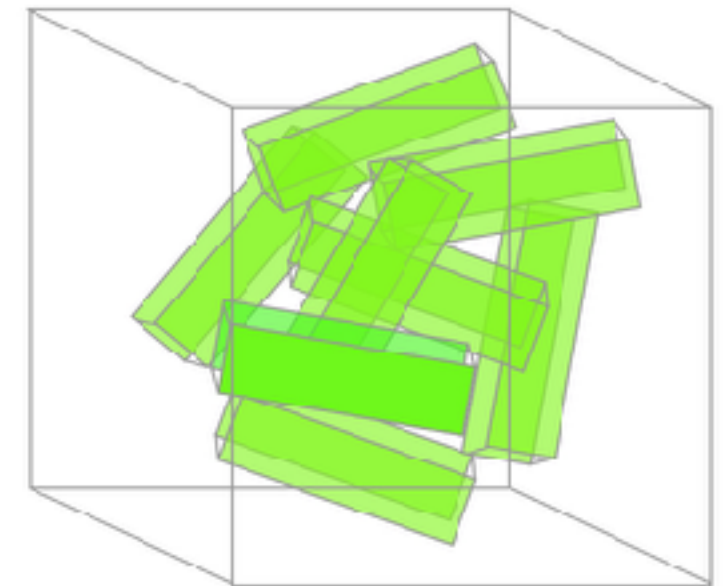
Nitrogen Porosimetry



SAXS



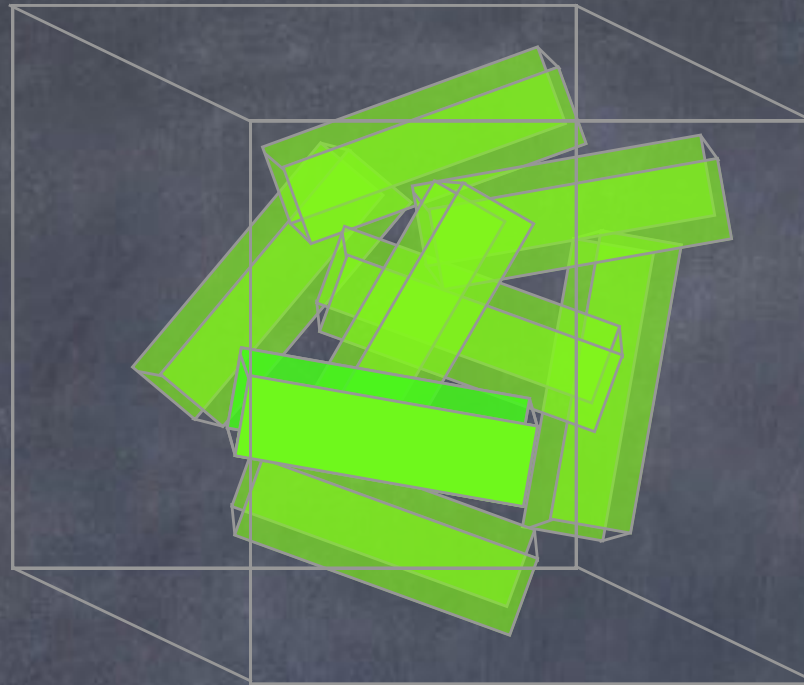
3D representation



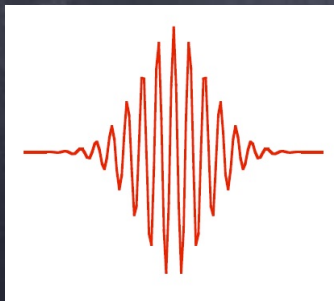
N. Vordos et al., "Kidney stone nano-structure – Is there an opportunity for nanomedicine development?,"
Biochimica et Biophysica Acta (BBA) – General Subjects, Jan. 2017.



a



b



N. Vordos et al., "Kidney stone nano-structure – Is there an opportunity for nanomedicine development?,"
 Biochimica et Biophysica Acta (BBA) – General Subjects, Jan. 2017.

Μελέτη Περίπτωσης



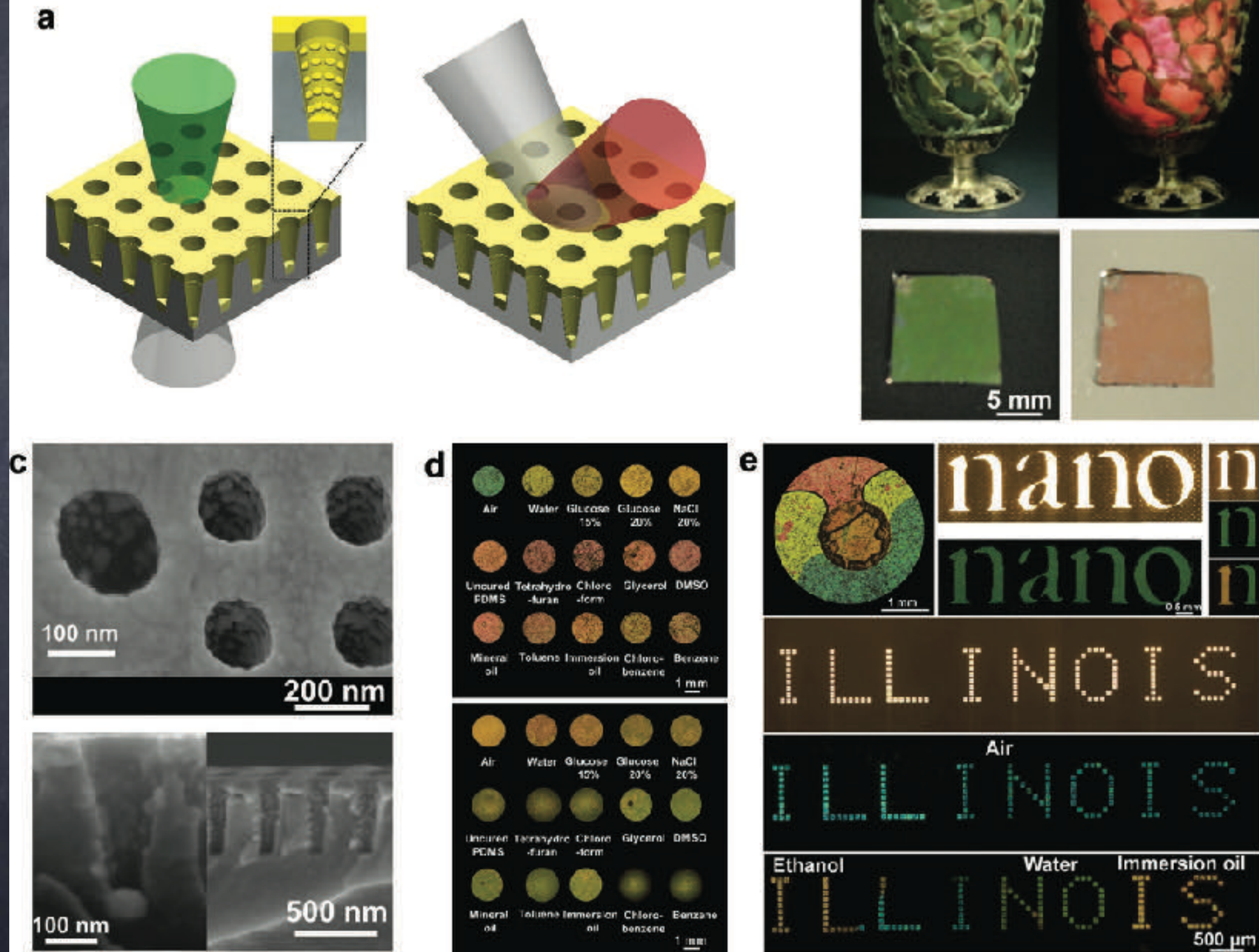
Η κούπα του Λυκούργου



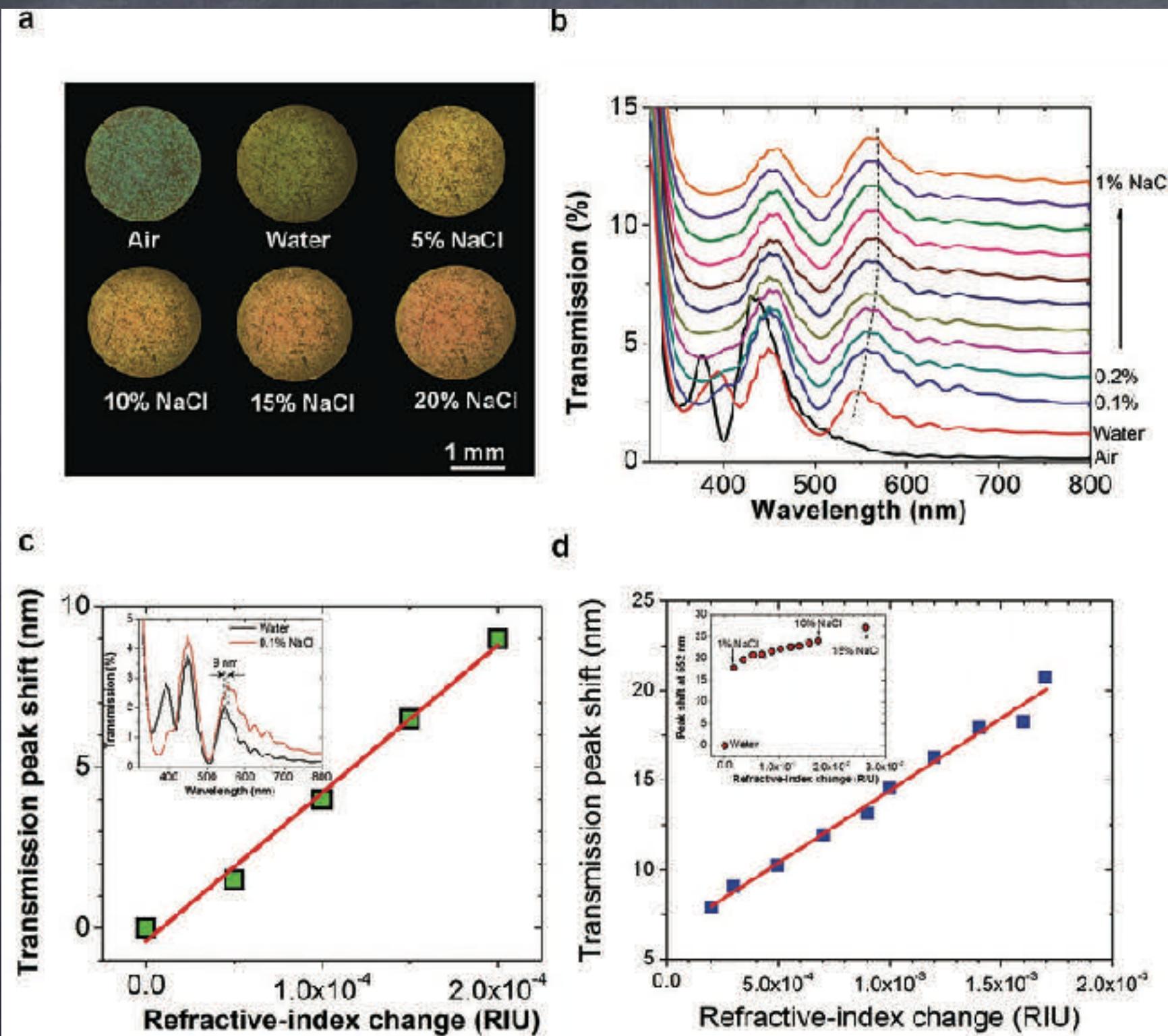
M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycurgus Cup Arrays,"
Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.



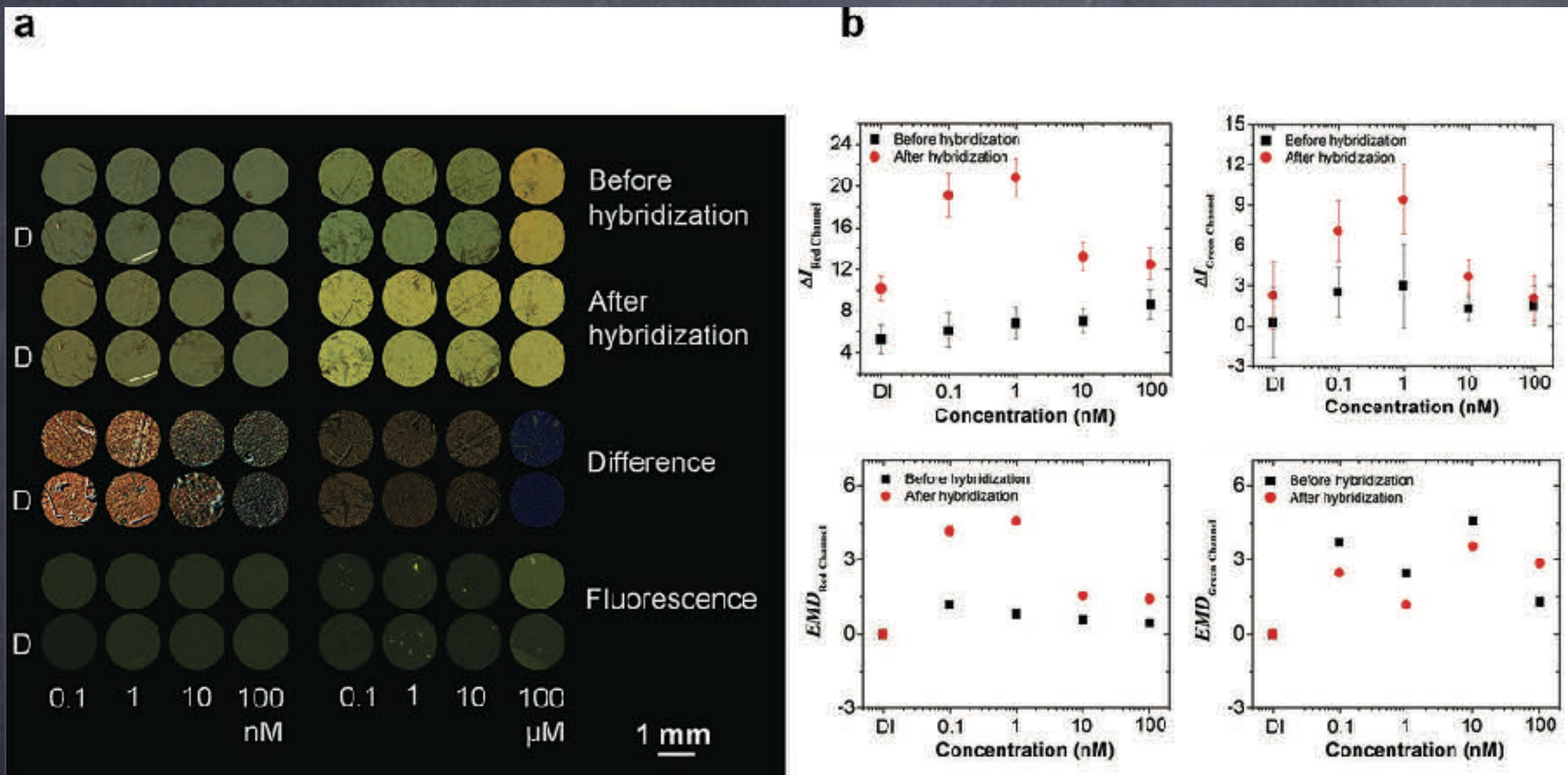
M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycurgus Cup Arrays,"
Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.



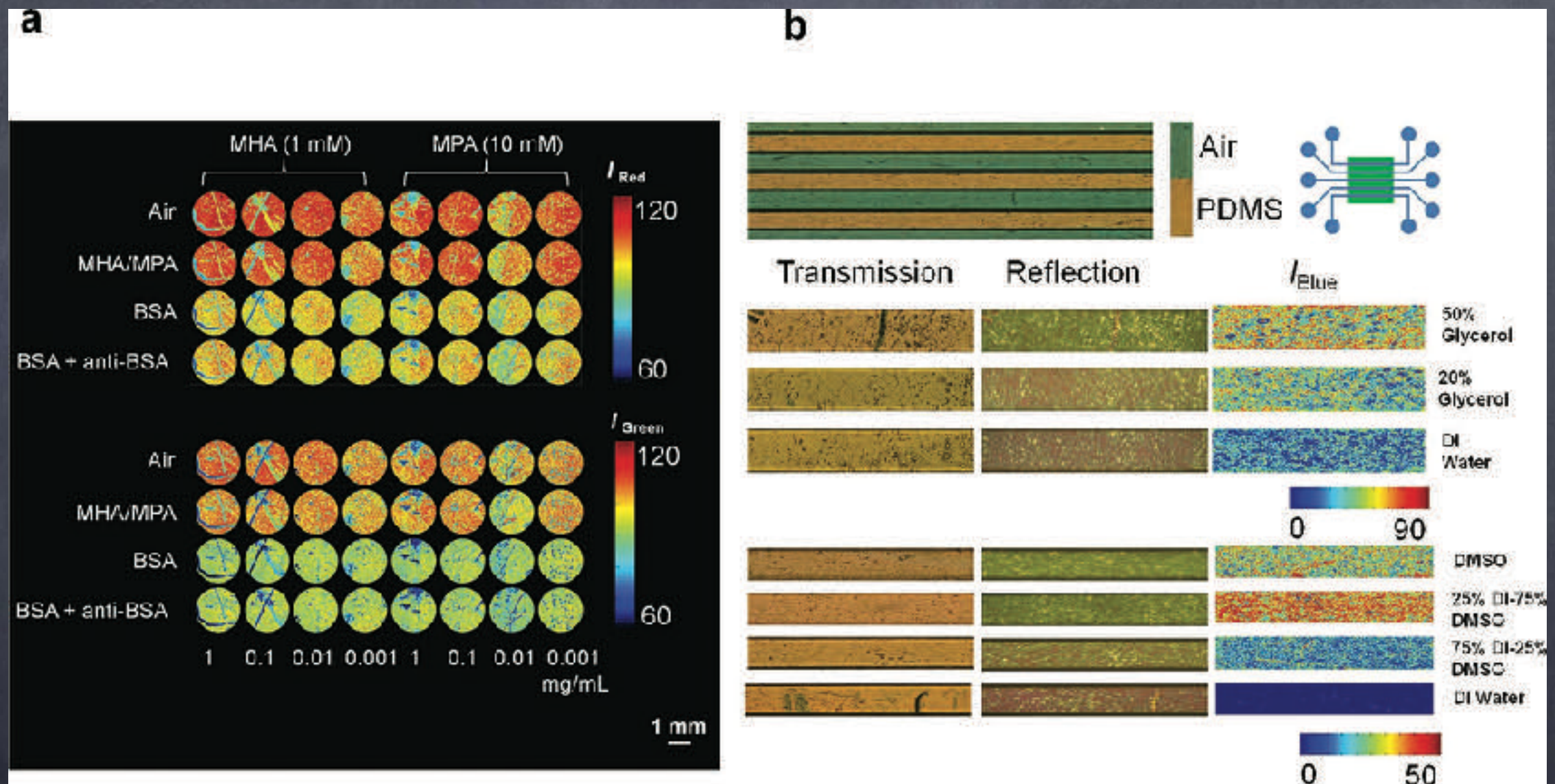
M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycurgus Cup Arrays," Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.



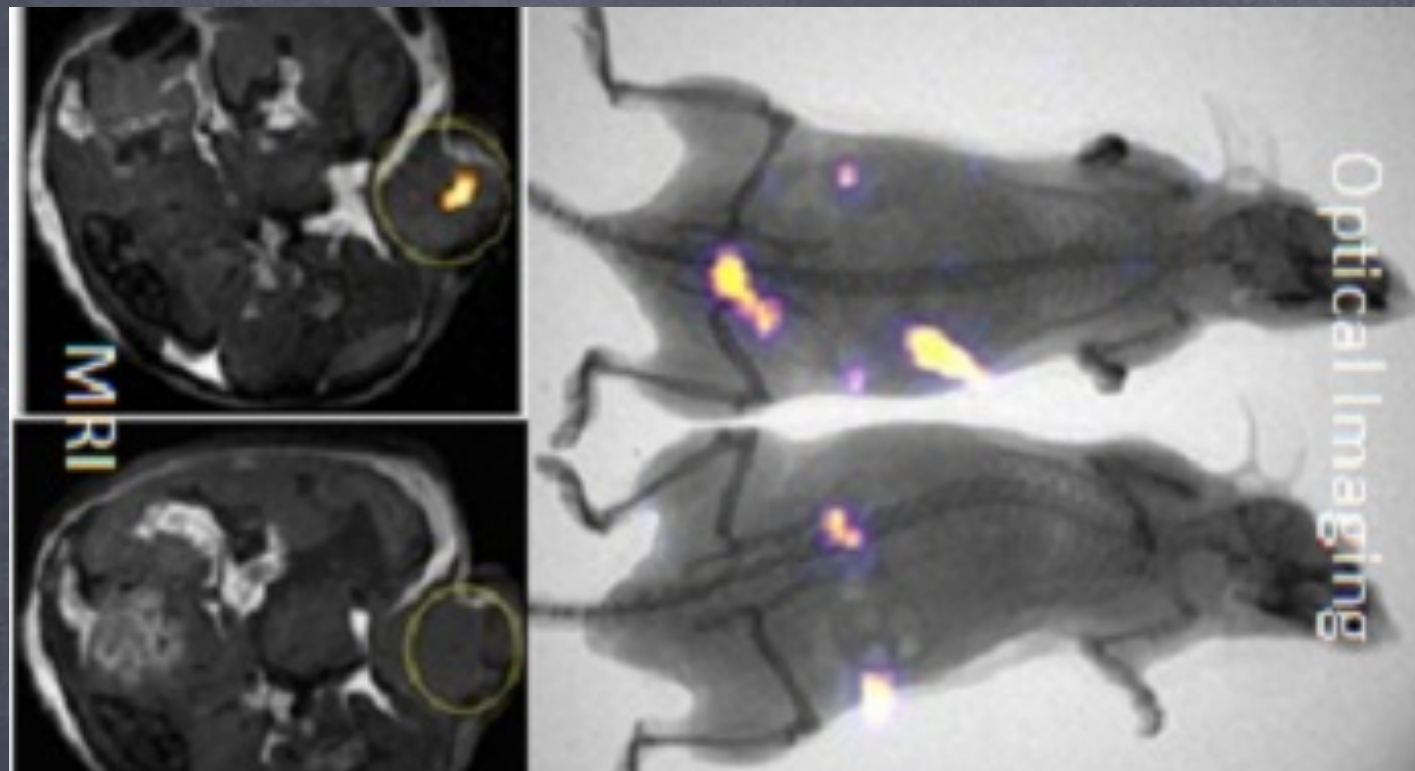
M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycurgus Cup Arrays," Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.



M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycurgus Cup Arrays," Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.



M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycorgus Cup Arrays," Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.



M. R. Gartia et al., "Colorimetric Plasmon Resonance Imaging Using Nano Lycurgus Cup Arrays,"
Advanced Optical Materials, vol. 1, no. 1, pp. 68-76, Jan. 2013.