



PROF CYWINSKI

OR: HOW I LEARNED TO STOP WORRYING AND LOVE THE NEUTRONS





SUE AND BOB'S ADVENTURES_{in} NEUTRONLAND

“Bob says...”

Bobs says

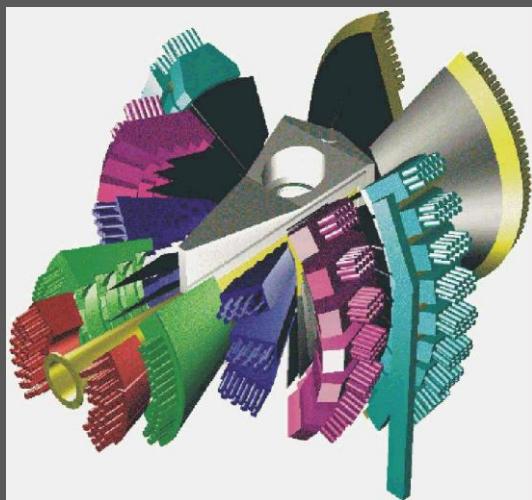
26/10/07

Intensity of neutron scatter peaks IS the
structure form factor of the atom.

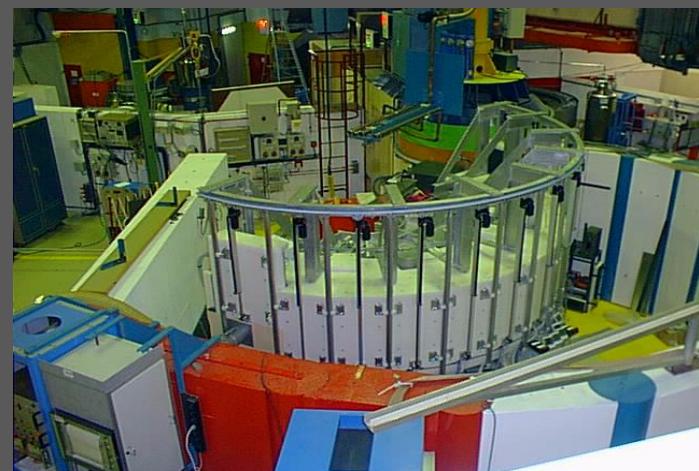
Bob says

26/10/07

Calculate structure factor for YF_3
Laves phase + be able to pinpoint exactly
where all the atoms be.

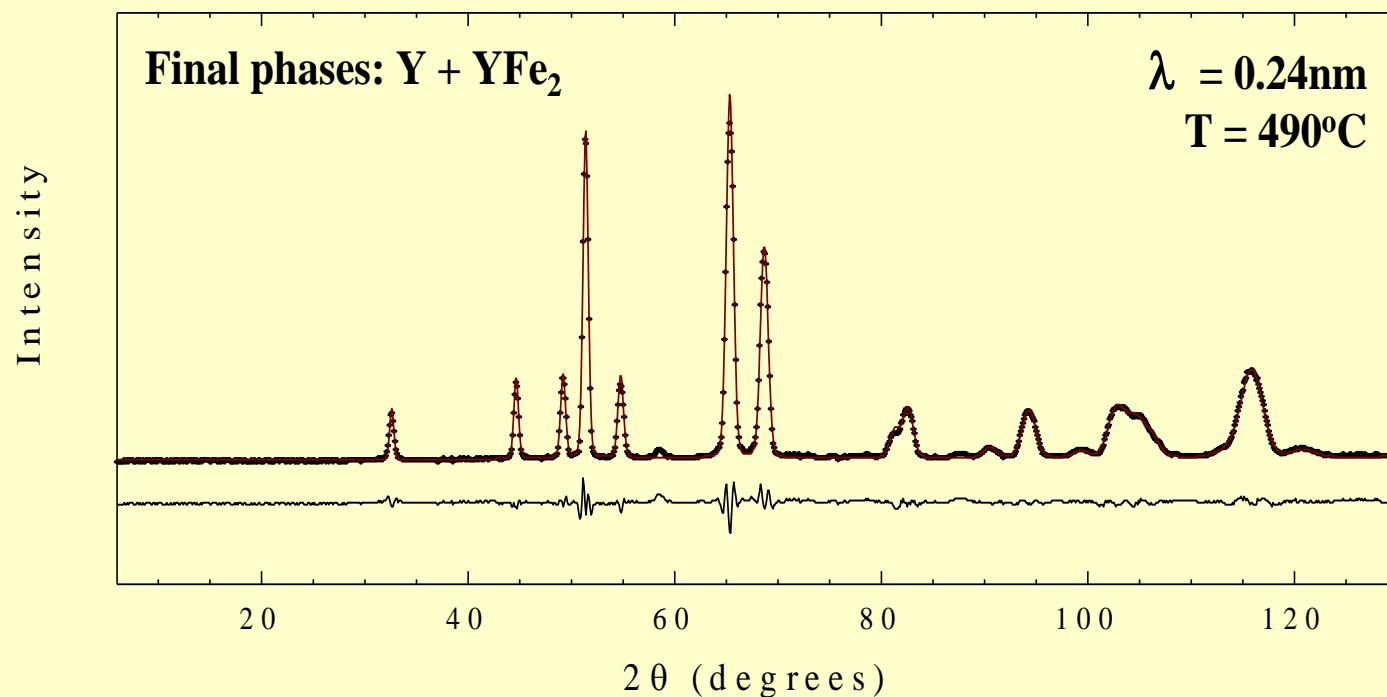


GEM, ISIS

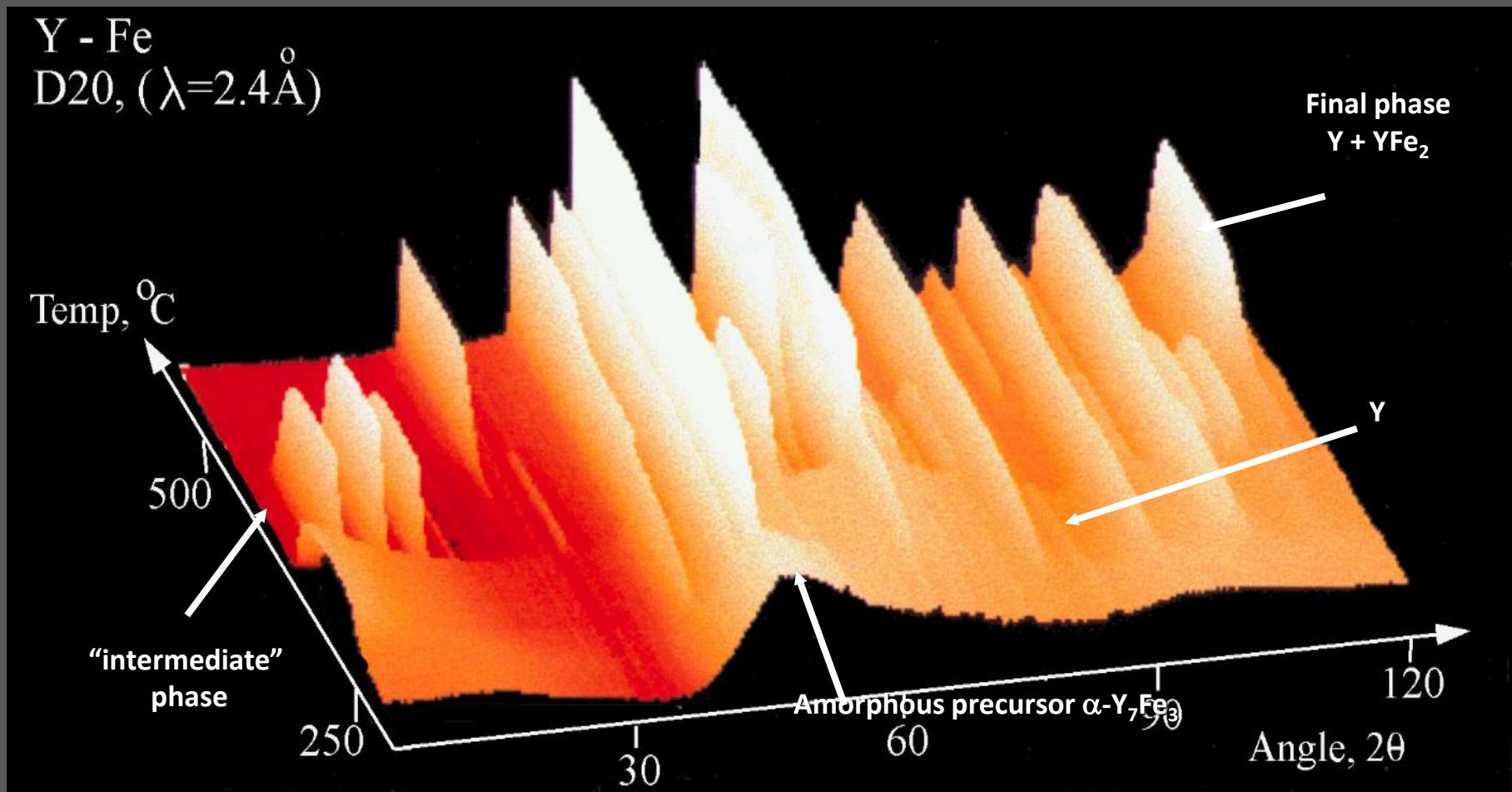


D20, ILL

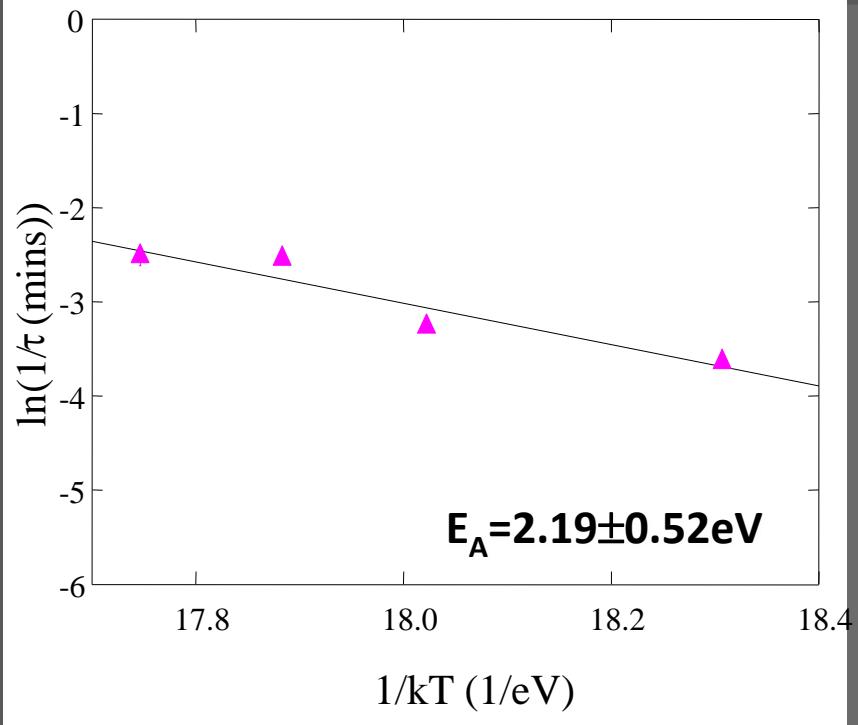
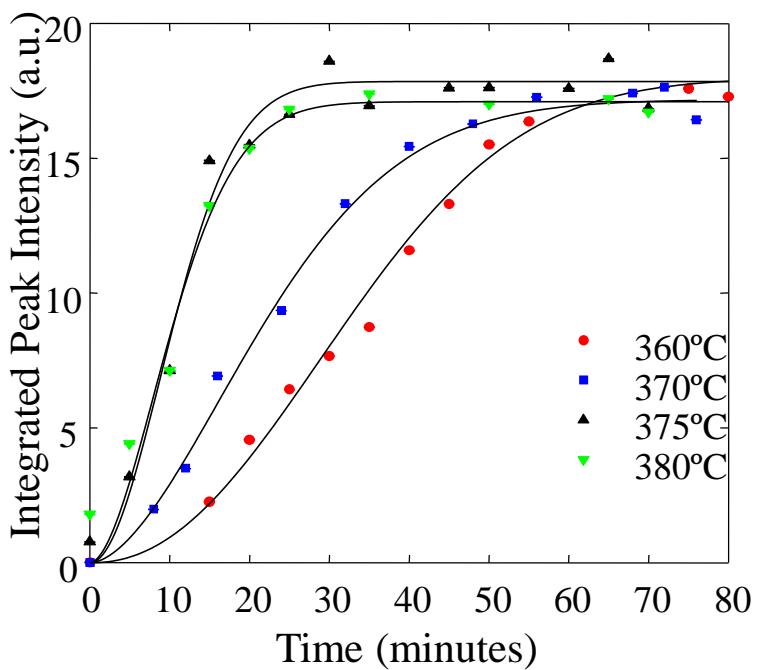
Crystallisation of $\text{Y}_{67}\text{Fe}_{33}$ – Rietveld refinement of $\text{Y} + \text{YFe}_2$



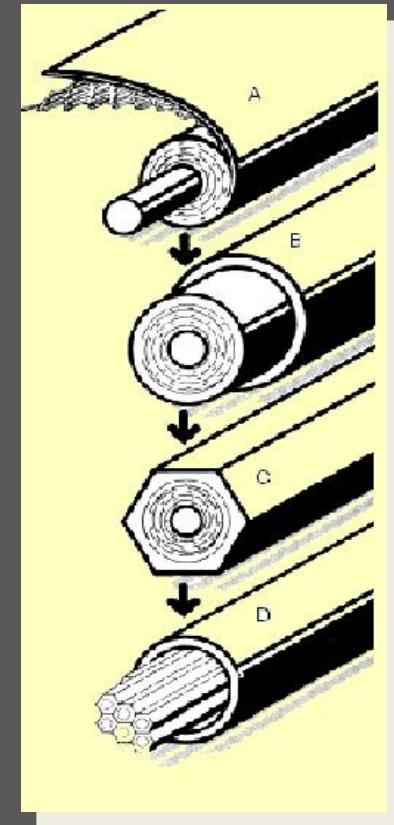
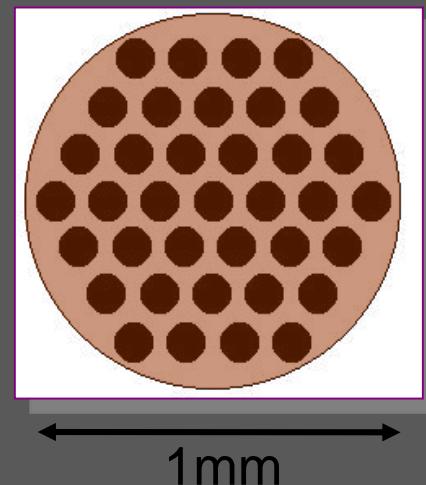
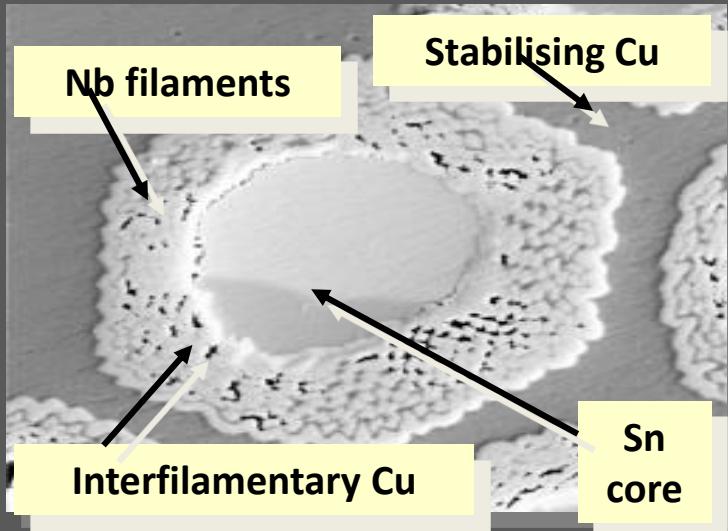
Kinetics of YFe Formation-Temperature Dependence



Kinetics of YFe Formation-Time Dependence



Nb_3Sn multifilamentary superconducting wires



Bbs says

Calculate lattice parameter from d spacing
value of Ns (a₀c)



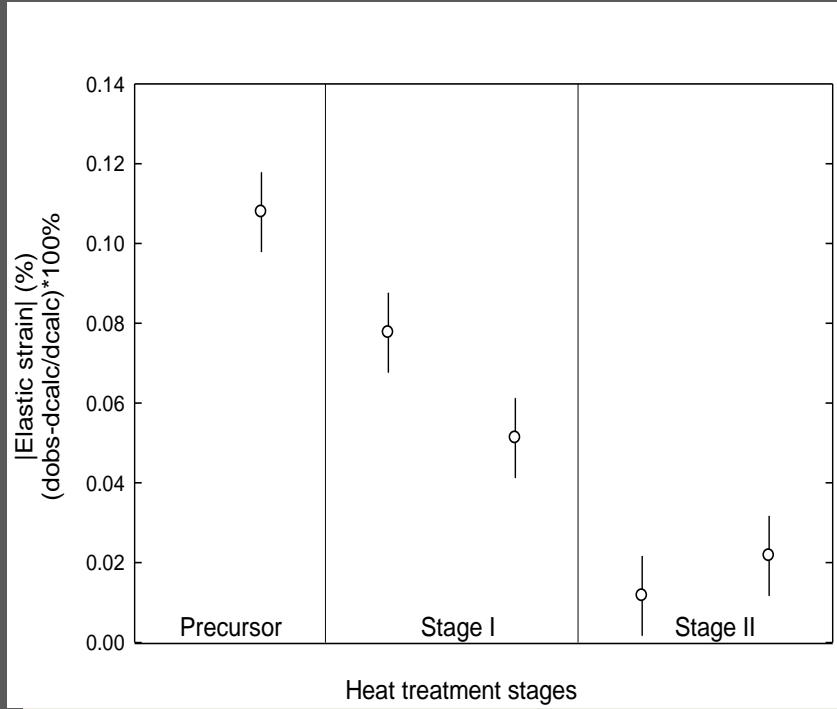
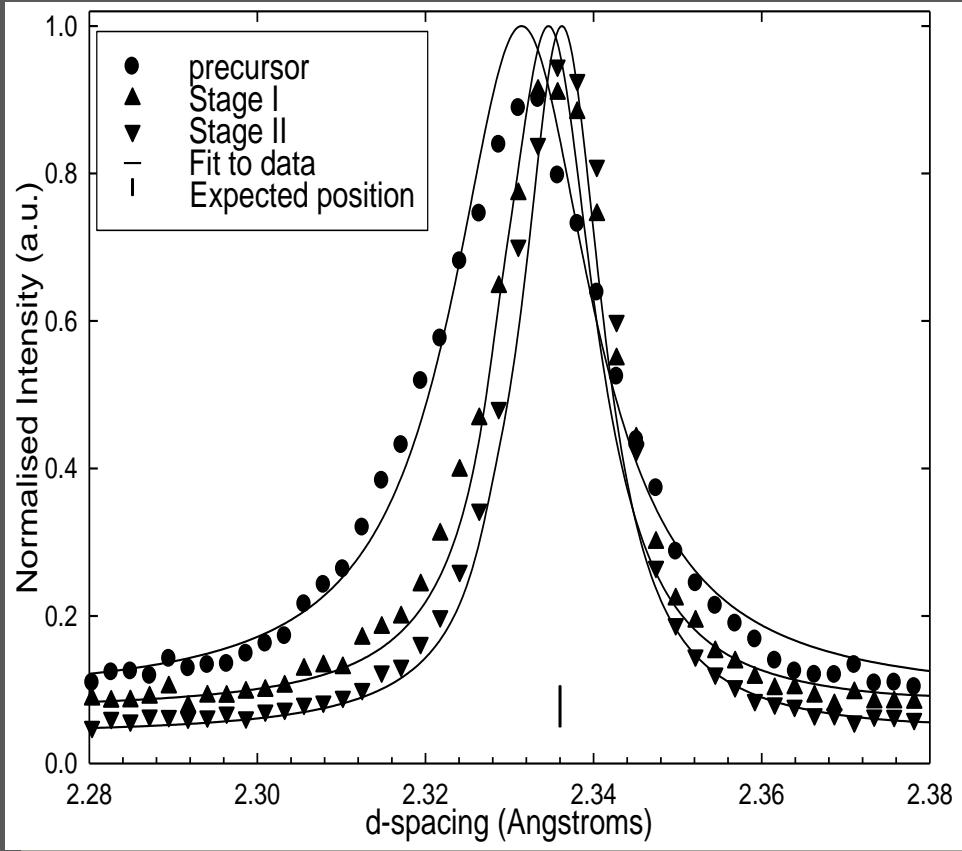
put this into program.

$$d_{\text{lattice}} = \frac{a}{\sqrt{a^2 + b^2 + c^2}} = 2.329\sqrt{2}$$

Sue says

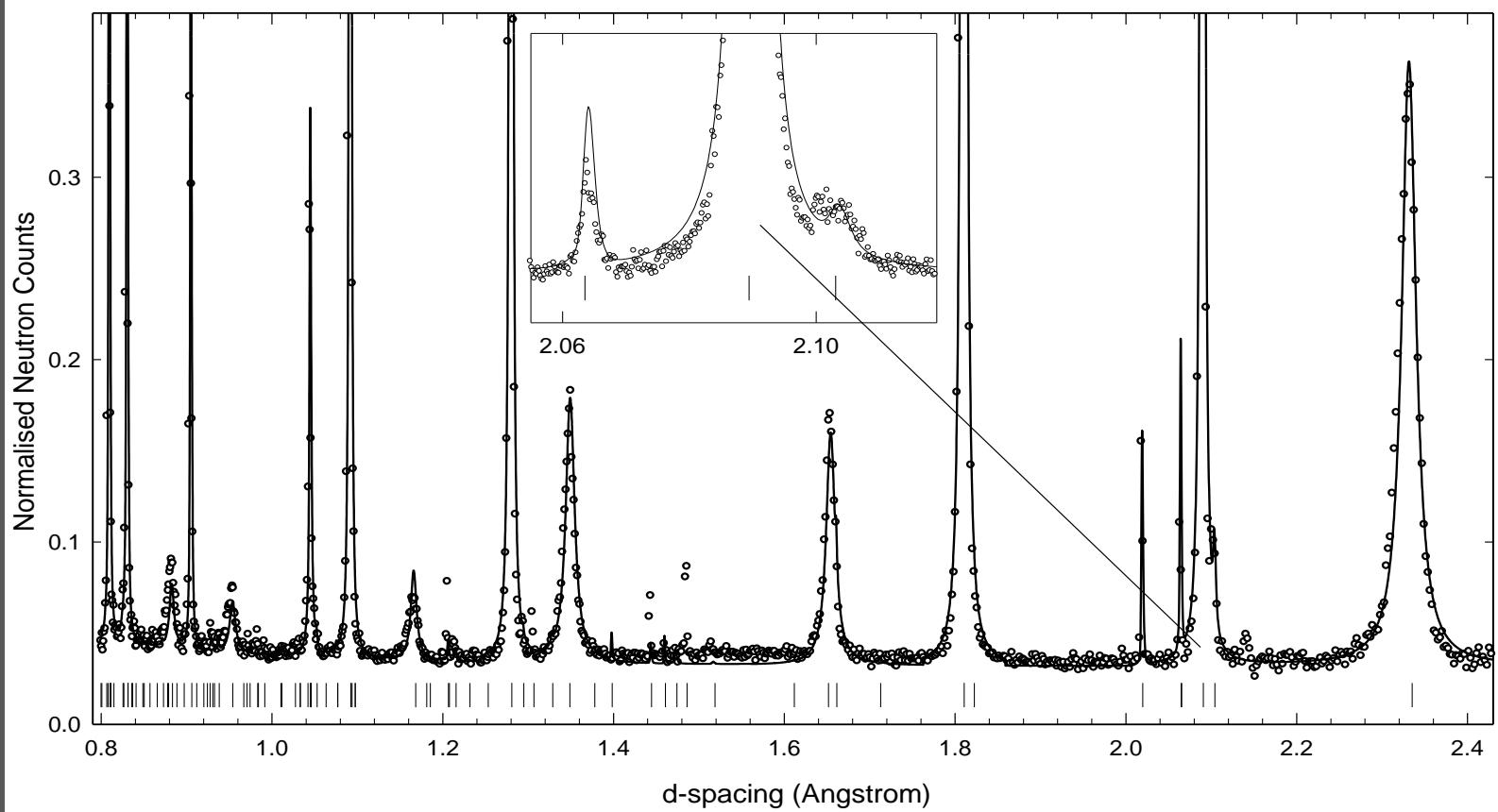
It could be that there is strain in the Nb
distorting it to a tetragonal structure,
not an actual space group ~~space~~
crystallographic transformation

Stage 1 and 2- Strain in Nb phase



5/2/2

Sue & Bob both think it could be preferred
over random.

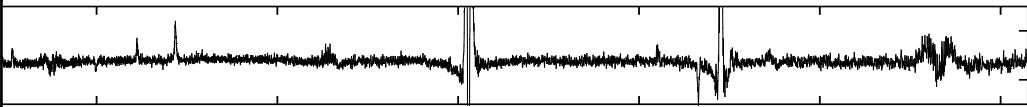


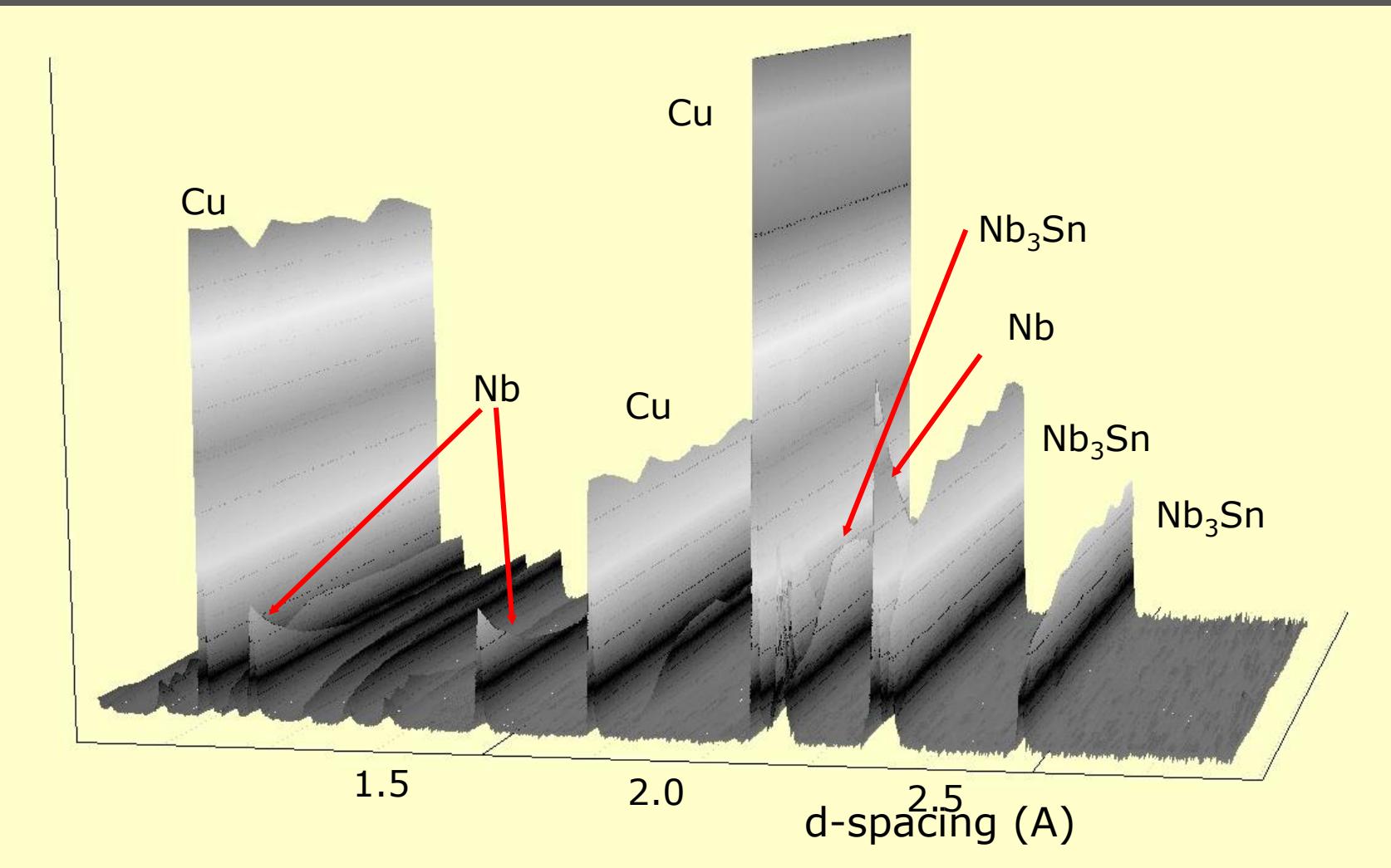
March-Dollase Preferred Orientation

Cu

Nb

| | | | |
|------------|----------------|------------|----------------|
| 111 | 2.57(2) | 110 | 3.24(3) |
| 100 | 2.39(1) | | |





I did it my way...

...or did I?

03/06/04

Bob says: 6

1. get figures in publication quality first.
2. Then lay them out to tell the story
3. Then write the story
4. Then research and make notes on the papers + lists yr unsure about
5. Then add those lists in.

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am
sm

ELSEVIER



ELSEVIER

M Al-J

¹ Departn
Leeds LS:
² Institute

E-mail: m.al-jawad@leeds.ac.uk

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Keywords: Nb₃S**1. Introduction**

The super
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Physica B 350 (2004) e557–e560

INSTITUTE OF PHYSICS PUBLISHING

J. Phys.: Condens. Matter **18** (2006) 1449–1457

JOURNAL OF PHYSICS: CONDENSED MATTER

doi:10.1088/0953-8984/18/4/028

Kinetic neutron diffraction study of Nb₃Sn phase formation in superconducting wires

M Al-Jawad¹, P Manuel², C Ritter³ and S H Kilcoyne⁴

¹ School of Physics and Astronomy, University of Leeds, Leeds LS2 9JT, UK

² ISIS Facility, Rutherford Appleton Laboratory, Didcot, Oxfordshire OX11 0QX, UK

³ Institut Laue Langevin, Grenoble, France

⁴ Institute of Materials Research, University of Salford, Salford, M5 4WT, UK

E-mail: m.al-jawad@leeds.ac.uk

Received 31 October 2005

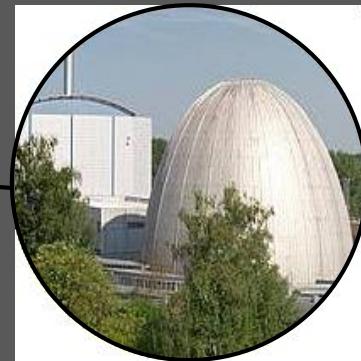
Published 13 January 2006

Online at stacks.iop.org/JPhysCM/18/1449**Abstract**

The kinetics of Nb₃Sn phase formation in commercial multifilamentary wires have been studied as a function of time and temperature using time-resolved, *in situ* neutron diffraction. This work shows that at higher temperatures the Nb₃Sn phase forms in a fraction of the recommended annealing time. A temperature-independent Avrami exponent of $n = 0.51 \pm 0.01$ was observed, indicating a diffusion-controlled growth mechanism, and a large apparent activation energy

“Bob says: why don’t you apply for an
EPSRC Life Science Interface Fellowship?”

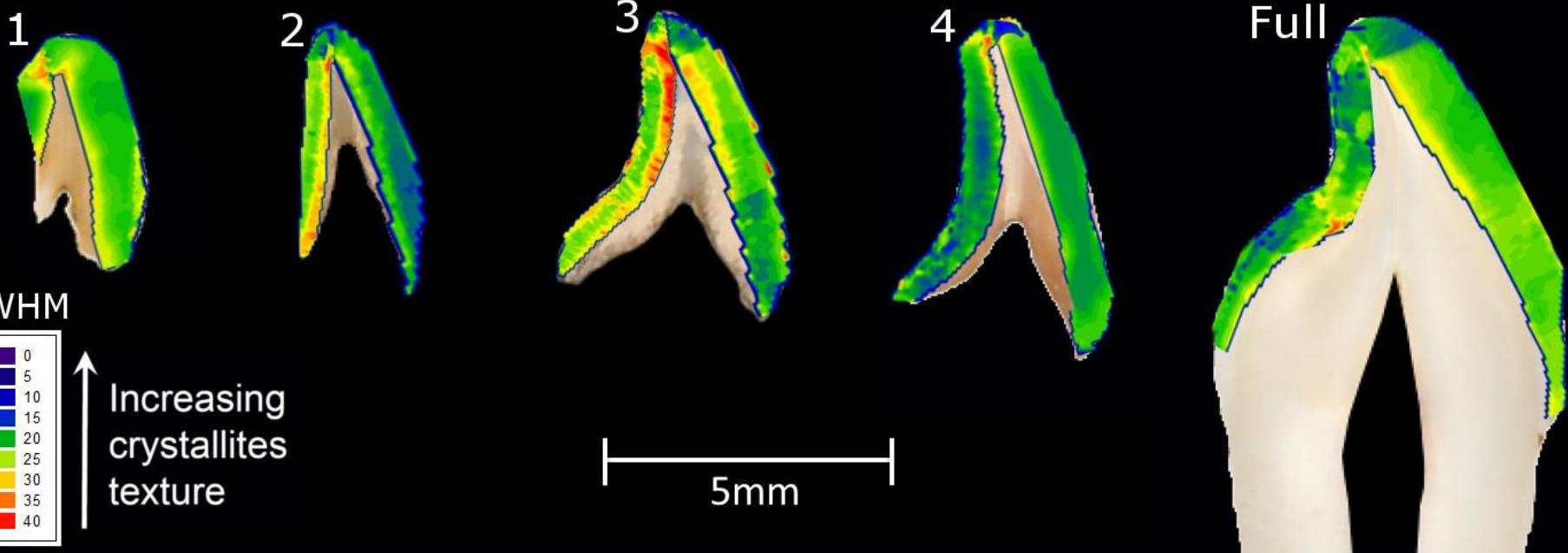
Neutron and Synchrotron Scattering Experiments in Europe and USA



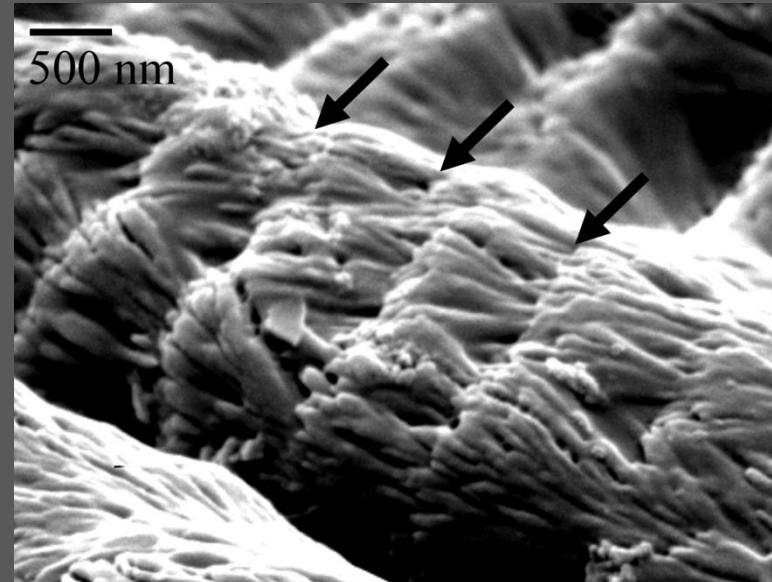
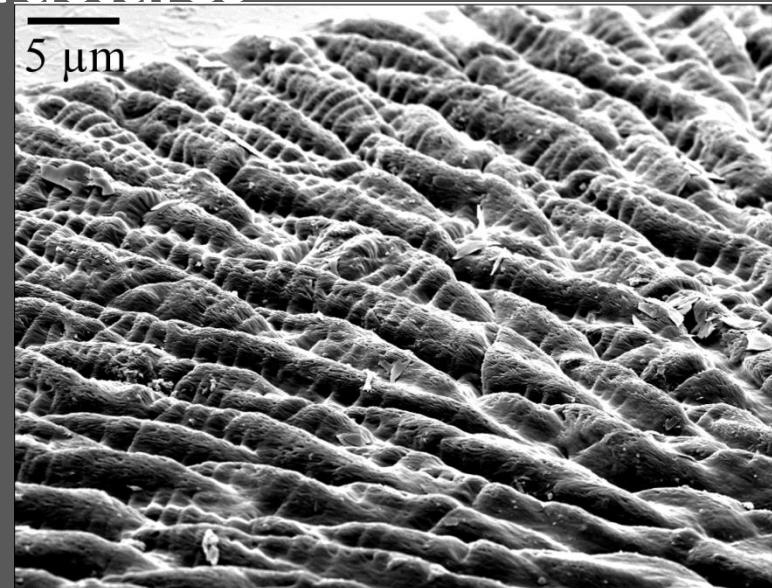
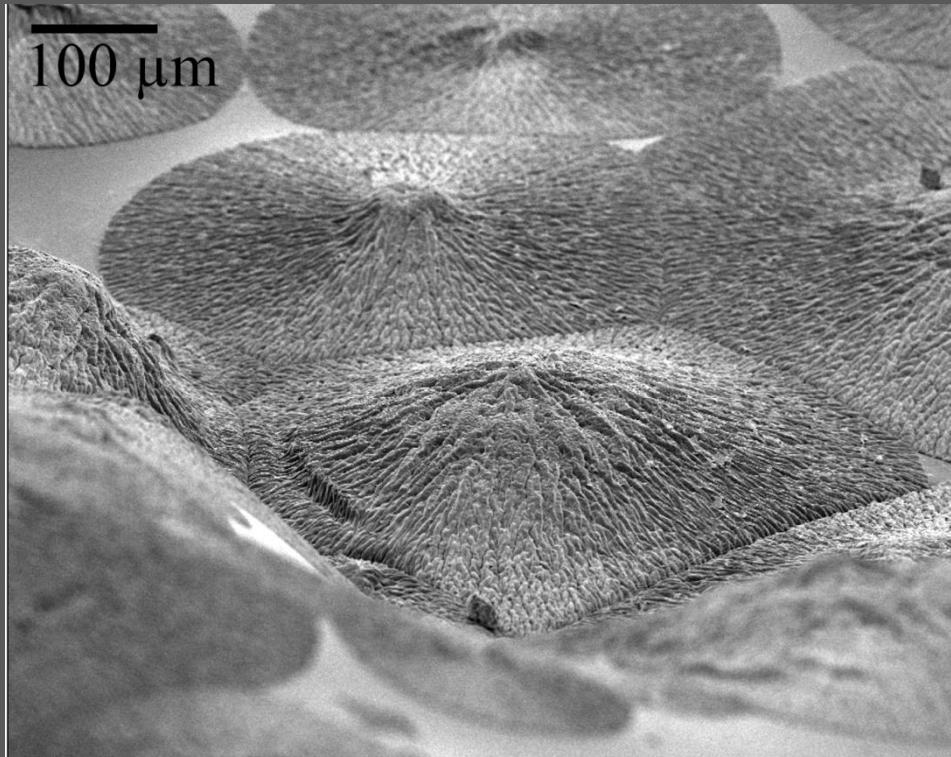
Characterising the Crystallization during the formation of Human Enamel

Average
Peak B & D

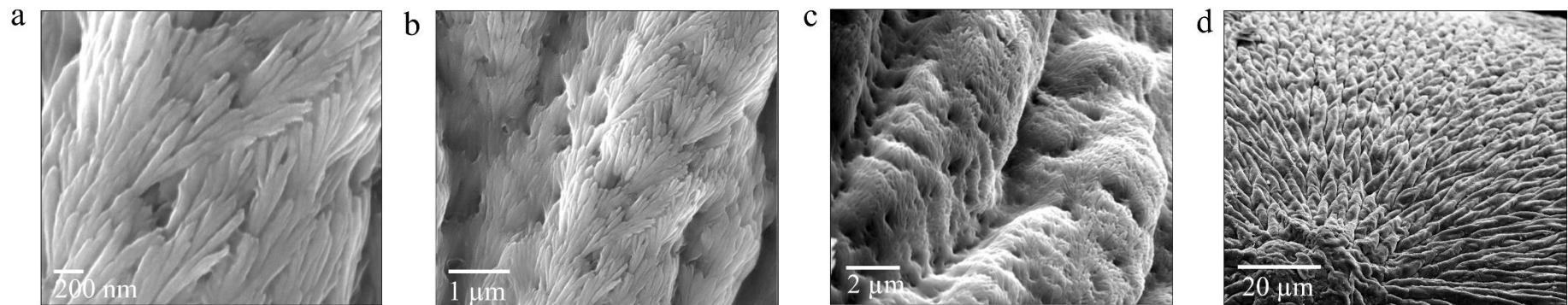
Maturation direction →



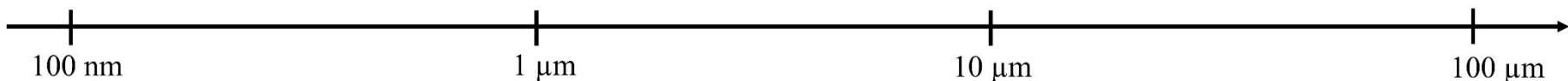
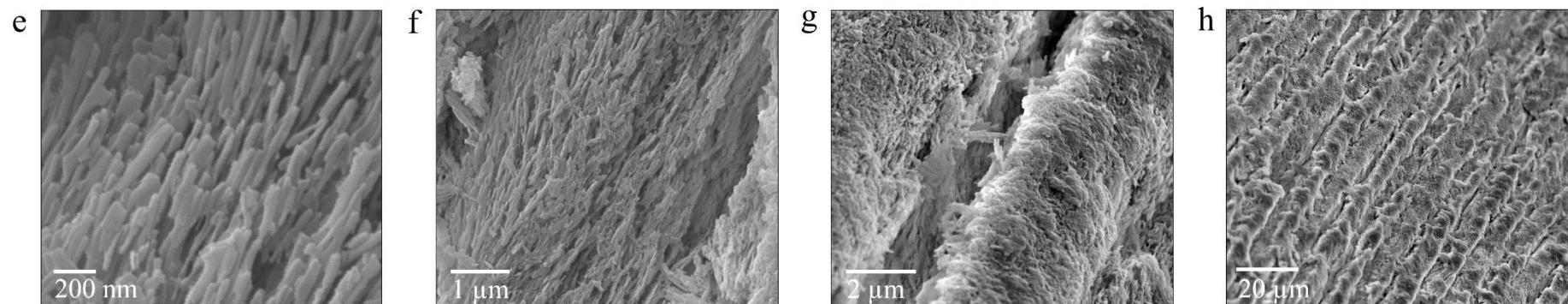
Synthetic Crystallization that forms Hierarchical Enamel-like Structures



Enamel-like Hierarchically-Ordered Mineralised Structures



Human Dental Enamel



6/4/2016

Maisoun says

Thank you Bob!