Crystal Transformation In Thin Silver Films

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We have found evidence for:

1. abnormal grain growth in many orientations
2. non-columnar subsurface growth

Thin Films

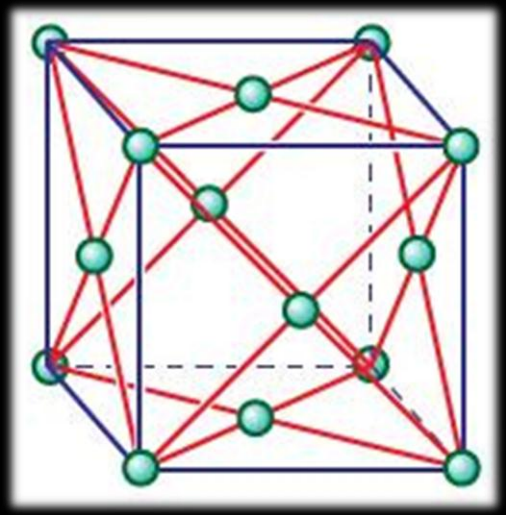
up to a few micrometers in thickness

hard drives, circuit boards and protective coatings

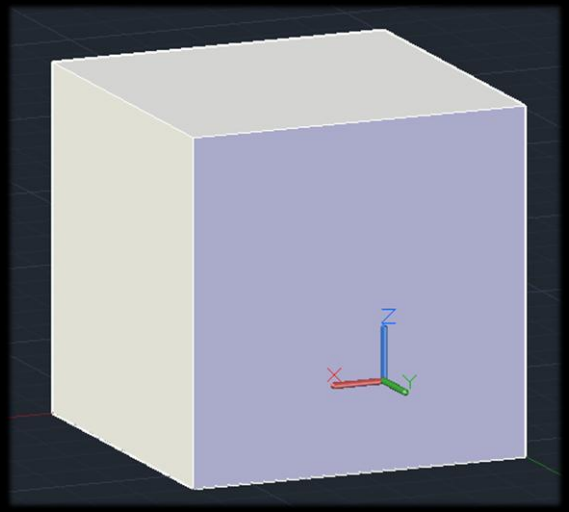
Crystallography

A crystal is a repeated structural pattern.

For silver, this is a face centered cubic (fcc).



Crystal Orientations



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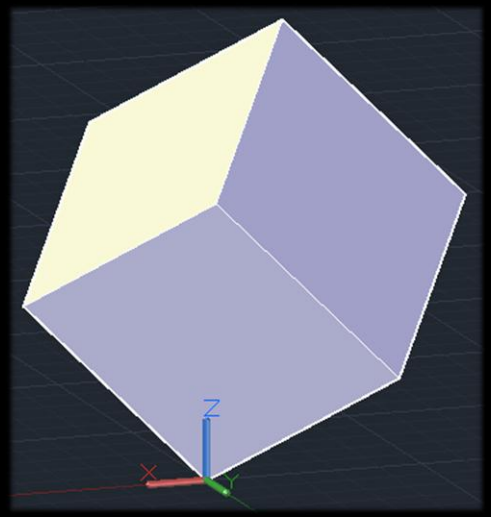

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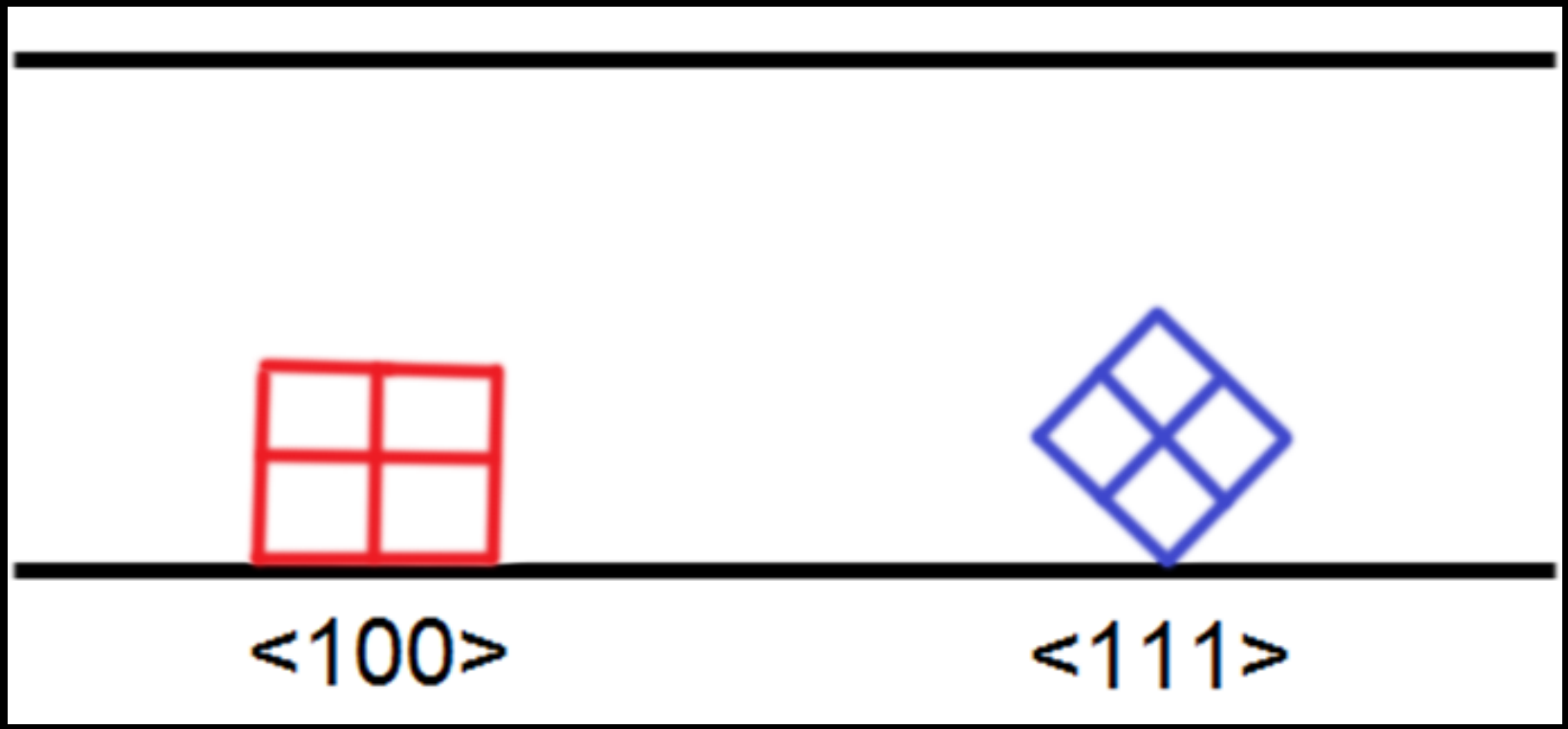
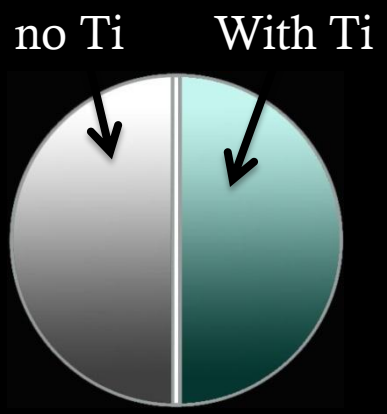
Crystal Orientations

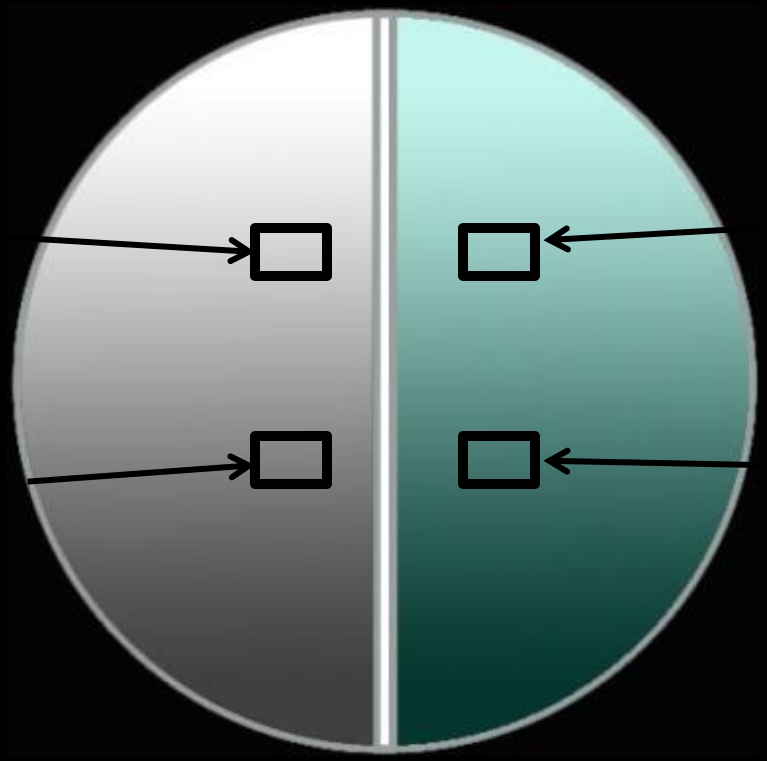


Our thin films

- Thin silver films on silicon substrate
- half with Ti layers

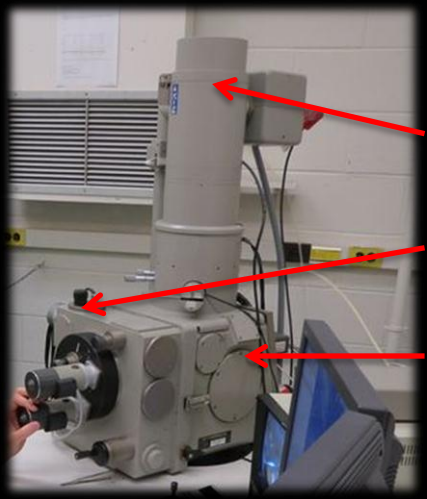


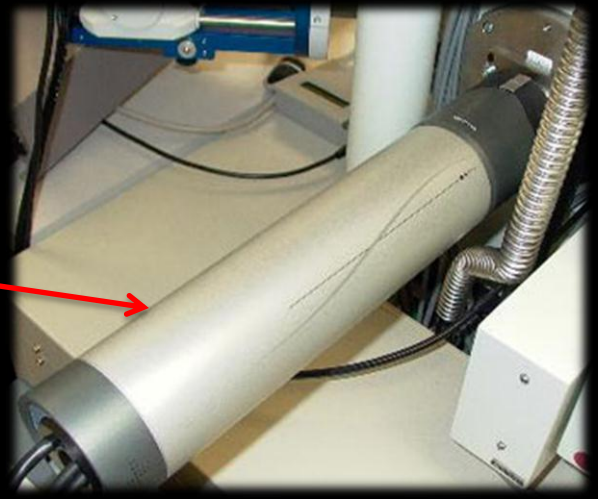
Our thin films



Apparatus

- Scanning electron microscope (SEM)
- Electron backscatter diffraction (EBSD)





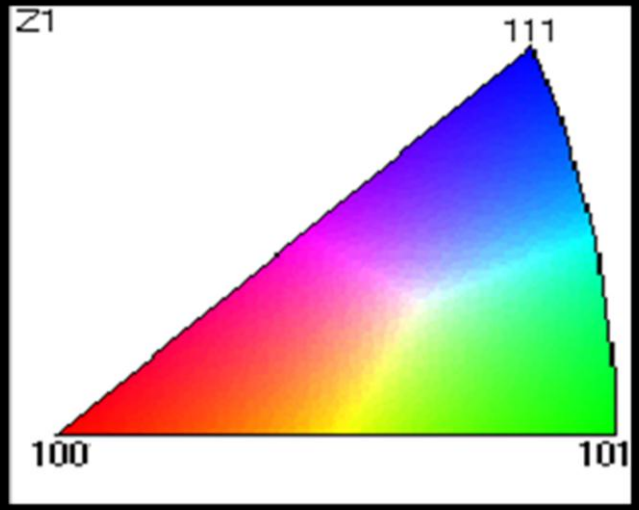
Grain Growth

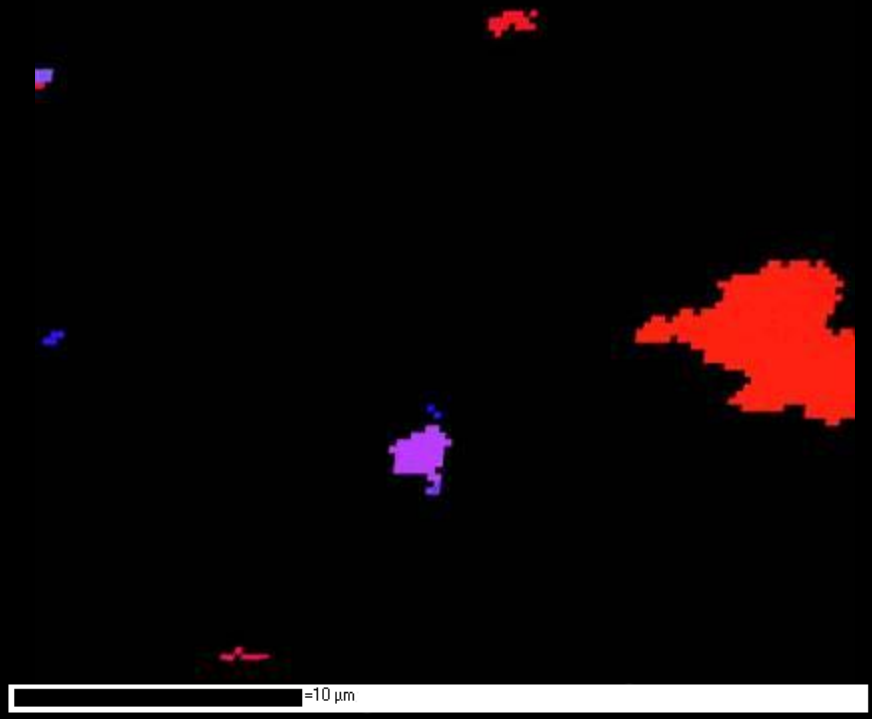
Abnormal grain growth changes the texture,

normal grain growth does not.

Results

1800 nm, with Ti





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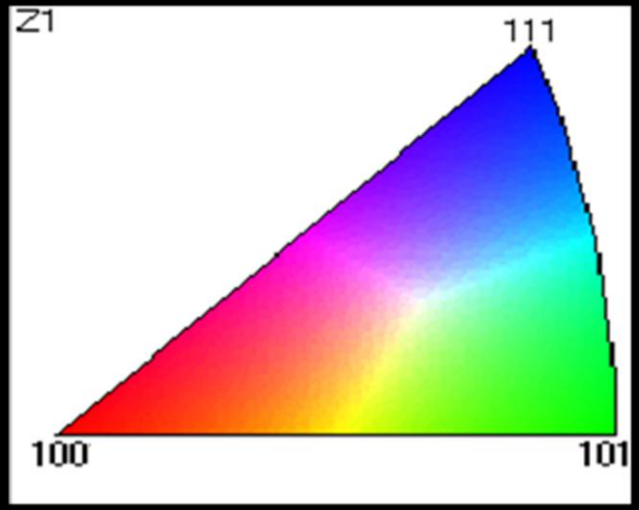
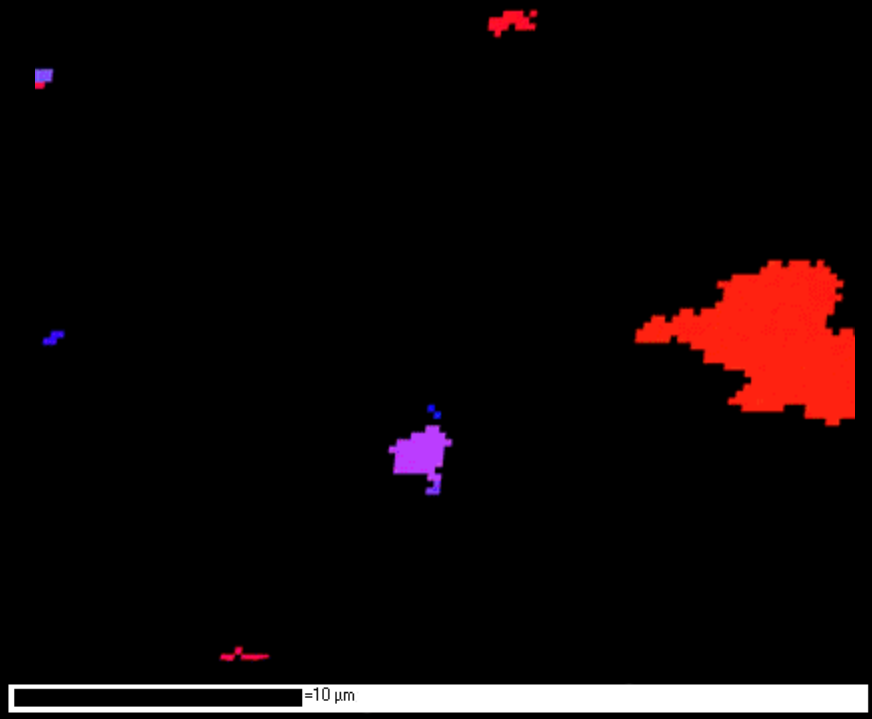
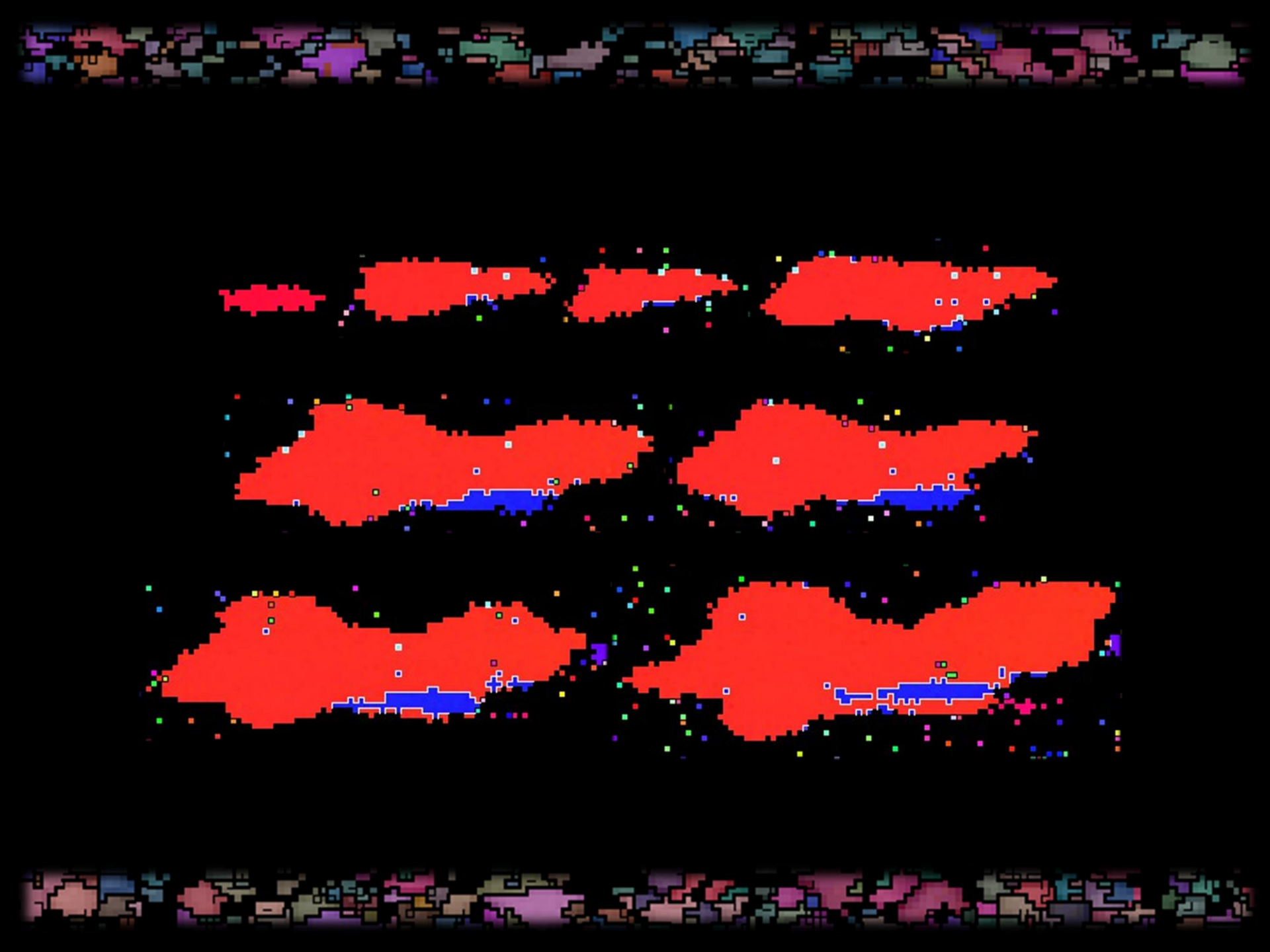
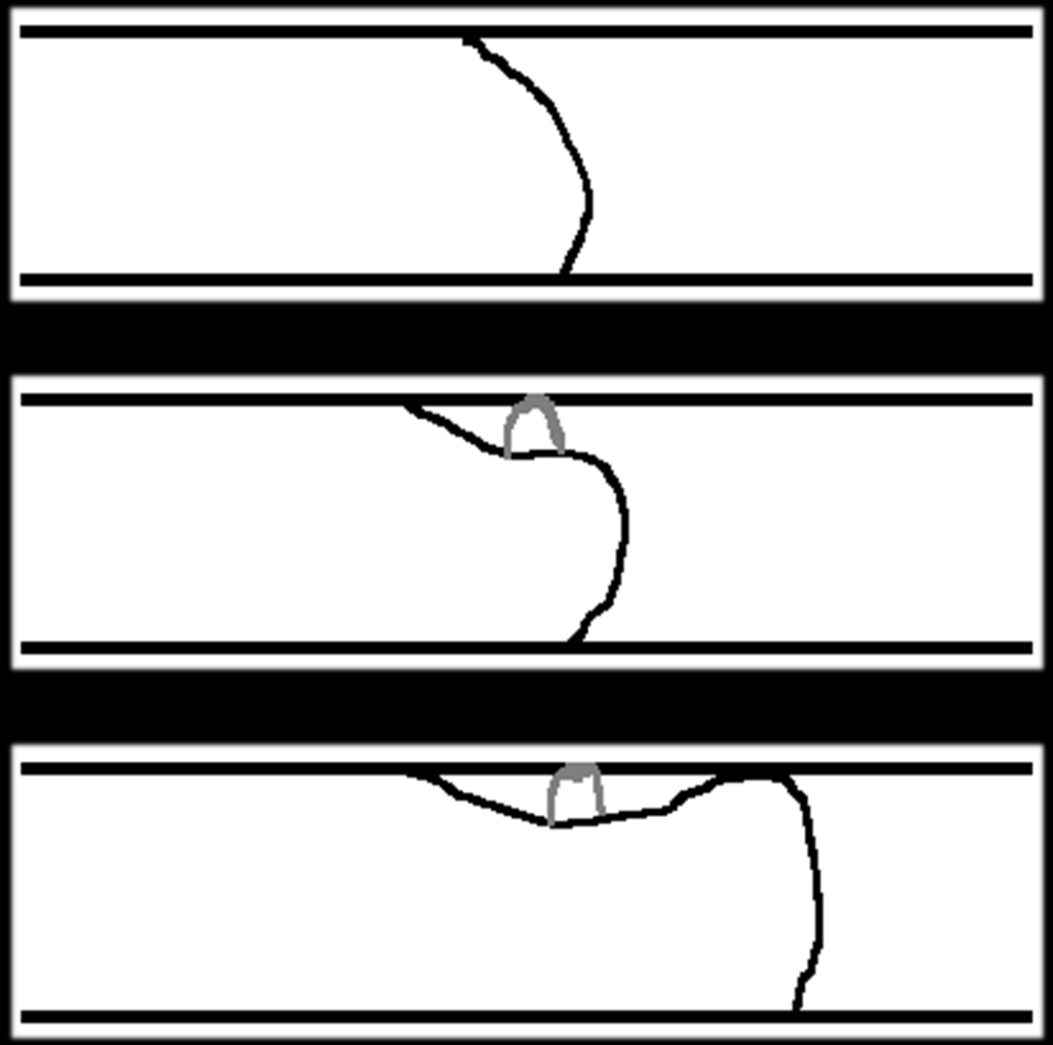




Subsurface Growth

Evidence for non-columnar subsurface growth





Questions?