

Given a sample of an unknown mineral,

What steps and tests would you undertake to completely describe and identify the unknown?

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Identifying an Unknown

- In most cases a hand sample of the unknown will be available and from this you can prepare samples for examination using a petrographic microscope by:
 1. grinding some sample to a powder for use in grain mounts, or
 2. cutting a thin section

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Identifying an Unknown

Hand Sample

- Determine physical properties:
 - Colour
 - Streak
 - Lustre
 - Hardness
 - Etc.
- Provide a tentative identification

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Identifying an Unknown

Thin Section

- As a first step, scan the whole thin section and identify grains of the unknown that exhibit different optical orientations, looking for:

Colour	Crystal shape
Relief	Textures
Twinning	Alteration products

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Identifying an Unknown

Thin Section (continued)

- These properties provide the best basis for distinguishing different minerals
- Remember to cross and uncross the polars and rotate the stage as needed
- Remember that different grains of the same mineral may exhibit different optical (relief) and physical (cleavage) properties depending on the orientation

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Identifying an Unknown

In the Thin Section

Record:

- Colour and pleochroism
- Relief relative to cement or oil
- Habit, textures and alteration
- Isotropic or anisotropic
- Nature of twinning, if present
- Nature of cleavage or fracture

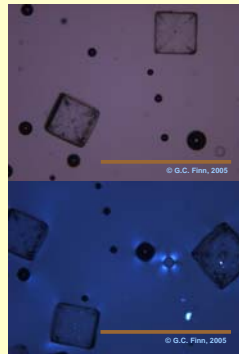
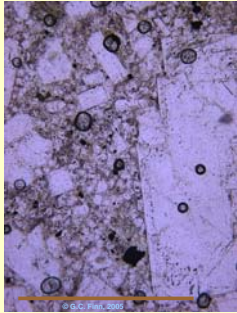
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Things to watch for!

- Thin sections may contain a variety of 'foreign' material that may be mistaken for minerals – you will find these!
- Common materials are:
 - Bubbles
 - Grinding powder
 - Textile fibres, hair

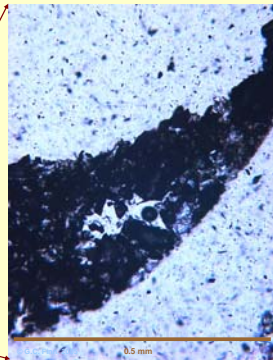
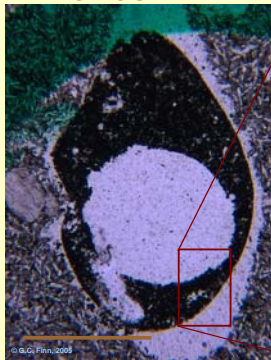
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Bubbles



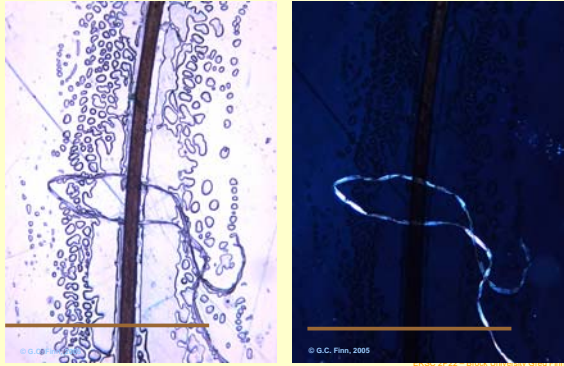
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Grinding Powder



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Fibres and Hair



Reality

- Identification of minerals is subject to ambiguity and uncertainty
 - Different minerals have similar properties
 - Some minerals have a wide range of properties
 - Properties may be incorrectly measured
 - Samples may be too small or in unusable orientations
- These problems, while real, become manageable with experience – the more you do the easier identification becomes

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