



# Standard XRD

Powder

0.05  $\mu$ m to 50  $\mu$ m

Powder X-ray diffractometry (PXRD)

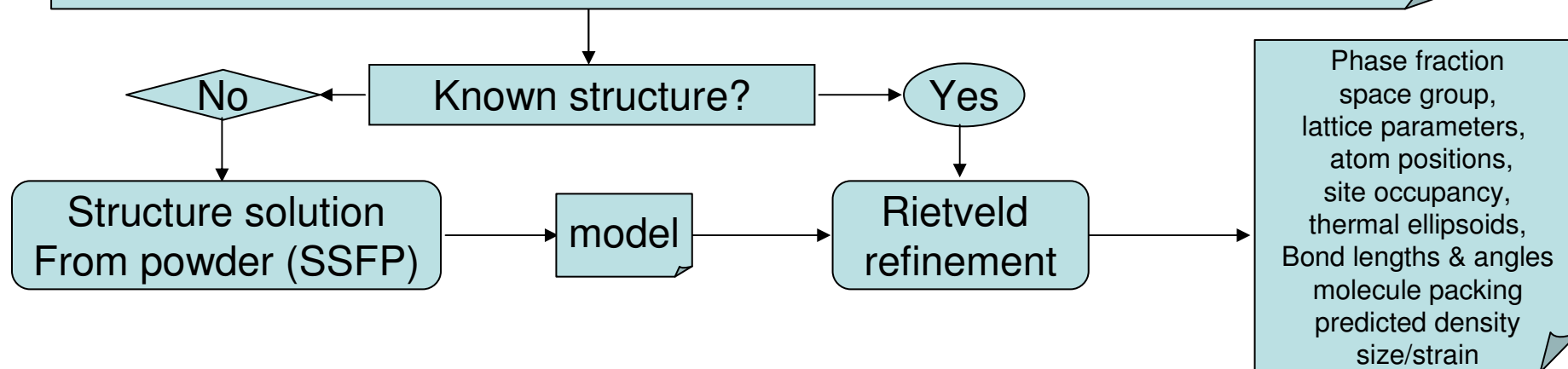
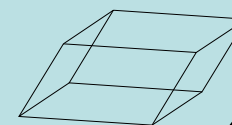
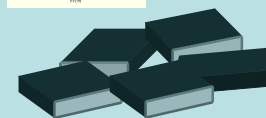
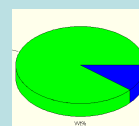
Phase identification: *What is this stuff?*

Phase fraction quantification via RIR: *How much is there?*

Out-of-plane preferred orientation: *Is sample non-random?*

crystallite size / micro-strain: *What can I learn about the particles?*

Lattice parameter indexation / cell refinement: *What is the cell?*



# Nano-crystalline

Powder

$< 0.05 \mu\text{m}$  (50nm)

Mo tube:  $\lambda = 0.7107 \text{ \AA}$

Powder X-ray Diffractometry (PXRD)

Atomic pair distribution function (aPDF)

Phase identification?

Out-of-plane preferred orientation:

crystallite size / micro-strain:

Known structure?

aPDF  
refinement

space group,  
lattice parameters,  
atom positions,  
site occupancy,  
thermal ellipsoids,  
Bond lengths & angles  
molecule packing  
predicted density  
size/strain

