

Materials Science Department

## X-Rays for Materials Characterization

CENIMAT-I3N / Structural Materials



**João Pedro Veiga**

Assistant Professor

2006

Ph.D. in Crystal Chemistry  
(Structural Analysis)

## Objectives

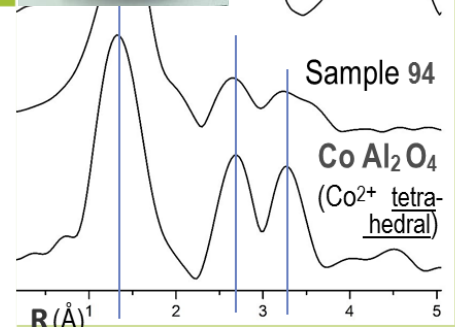
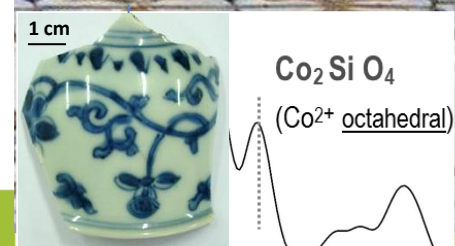
- Valence plus bonding state of chromophore ions (iron, copper, cobalt) in natural painting pigments and in ancient glazes (Portuguese tiles and faïences, Chinese porcelains).
- Binding state of strategic metals - particularly, indium - in sulphide ores and oxides; Rare earth elements (Se, Rh).
- Coordination of hazardous metals in sulphates from acid mine drainage.
- Theoretical interpretation of peculiarities observed in XANES spectra from sulphur (K-edge) and indium ( $L_3$ -edge).

## Methodology

- X Ray Fluorescence
- X Ray Diffraction
- X Ray Absorption Near Edge Spectroscopy (XANES)
- Extended X-Ray Absorption Fine Structure (EXAFS)
- Synchrotron Radiation

## Expected Results

- Understanding materials from the past – strategies for cultural heritage preservation.
- Nanomaterials for the protection of public art.
- Development of glasses with added value properties using nanoparticles.
- Strategies for recycling of rare-earth elements in mining residues.



Funding:

