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INDIUM BEFORE ENTERING THIN FILMS

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[with the collaboration of **Teresa P. Silva** within LNEG Project

PTDC/CTE-GIN/67027/2006 - *INCA: Characterization of crucial mineral resources for the development of renewable energy technologies: the Iberian Pyrite Belt ores as source of indium and other high-technology elements* -

and in X-ray absorption experiments performed at the ESRF]

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Indium is a strategic scarce metal used both in classical technologic fields (e.g. low melting-temperature alloys and solders) and in innovative nano-technologies to produce “high-tech devices”, like liquid crystal displays (LCDs), organic light-emitting diodes (OLEDs) and transparent flexible thin-films incorporating amorphous oxide semi-conductors (IAOS). It is a typical chalcophile metal, seldom forming specific minerals and occurring mainly dispersed within polymetallic sulphides with excess metal ions.

The average content of indium in the Earth's crust is very low but a further increase in its demand is still expected in years to come, thus focusing a special interest in the improvement of recycling technologies and uncovering new exploitation sites through promising polymetallic sulphide ore deposits – namely, the Portuguese zone of the Iberian Pyrite Belt (IPB).

Indium recovery stands mostly on zinc extraction from sphalerite, the natural cubic zinc sulphide which is the prototype of so-called “tetrahedral sulphides” where metal ions fill half of the available tetrahedral sites within the cubic closest packing of sulphur anions and where the double of unfilled interstices are available for further in-filling, thus rendering such packing array particularly suitable to accommodate polymetallic cations by filling closely located interstitial sites. Studying the tendency towards In-In interactions leading to the formation of polycations would efficiently contribute to understand indium crystal chemistry and its binding state in natural chalcogenides. Accordingly, an X-ray Absorption Near-Edge Spectroscopy study* at In L_3-edge was undertaken at the ESRF (European Synchrotron Radiation Facility, in Grenoble/France). XANES results so far obtained are briefly presented and disclose a challenging clue for indium binding state.

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