

## Chlorapatite identification in Putinga meteorite using Raman spectroscopy

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The Putinga meteorite (fall August 16, 1937) was classified as an L-type chondrite, due to its mineralogy, consisting of major olivine, orthopyroxene, and metallic nickel-iron, minor maskelynite and troilite, and accessory whitlockite and chromite [1]. A fragment of the meteorite (donated by the Luiz Englert museum-UFRGS) was analysed with scanning electron microscopy, x-ray microanalysis and micro-Raman spectroscopy. The backscattered electron image on figure 1 a) shows a 40 micron grain of a phosphate mineral with high chlorine content. Besides whitlockite ( $\text{Ca}_3(\text{PO}_4)_2$ ), chlorapatite ( $\text{Ca}_5(\text{PO}_4)_3\text{Cl}$ ) was identified for the first time as an phosphate accessory mineral in the Putinga chondrite, shown with characteristic x-rays (Fig. 1 b) and a micro-Raman spectrum (Fig. 1 c).

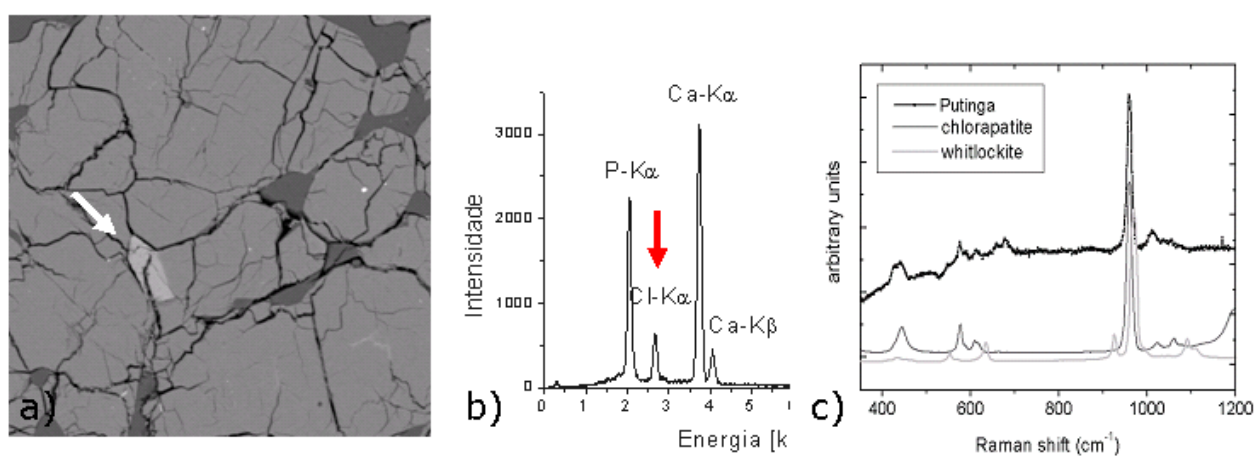


FIG. 1. a) SEM micrograph (width of image 240  $\mu\text{m}$ ), showing a chlorapatite mineral grain (white arrow) embedded in an olivine matrix; b) characteristic x-ray spectrum of this grain, with high chlorine content (red arrow) c) Raman spectrum of chlorapatite grain (plus standard chlorapatite and whitlockite spectra)

### References:

- [1] K. Keil, D. Lange, M. N. C. Ulbrich, C. B. Gomes, E. Jarosevich, A. Roisenberg, M. J. Souza, *Meteoritics* 13 (2) 165 (1978).