

Chemical diversity of calcifications in thyroid and hypothetical link to disease

Muriel Mathonnet,^a Arnaud Dessombz,^b Dominique Bazin,^{b,c} Raphael Weil,^b
Frédéric Triponez^d, Marc Pusztaszeri^d, Michel Daudon^{e,f,g}

^a Service de chirurgie digestive, générale et endocrinienne, CHU Dupuytren, Limoges, France

^b Laboratoire de Physique des Solides, Université Paris Sud, Orsay, France

^c CNRS-LCMCP-UPMC, Collège de France, Paris, France

^d Department of Clinical Pathology, Geneva University Hospital, Geneva, Switzerland

^e Sorbonne Universités, UPMC Univ Paris 06, UMR S 702, Paris, France.

^f INSERM, UMR S 702, Paris, France.

^g AP-HP, Hôpital Tenon, Explorations Fonctionnelles Multidisciplinaires, Paris, France.

Corresponding author:

Prof. Muriel Mathonnet, mathonnet@unilim.fr

Service de chirurgie digestive, générale et endocrinienne, CHU Dupuytren, Limoges, France

Running head: Chemical diversity of calcifications in thyroid

Keywords : Thyroid; Pathological calcifications; Fourier transform infrared spectroscopy; Field Effect Scanning Electron Microscopy, Ca Phosphate apatites; Ca Oxalate.

Abstract : Even though calcifications in thyroid nodules constitute a common finding in imaging and histopathology, and also may occur in both benign and malignant thyroid disease, their clinical importance remains unclear. A way to establish a possible relationship between their presence and the associated pathology may be given through a precise description of their chemical composition. In order to attain this goal, last generation Field Effect Scanning Electron Microscopy (FE-SEM) and classical Fourier Transform Infra Red (FT-IR) experiments have been performed on thyroid calcifications. Calcifications corresponding to different pathologies have been considered, including Graves' disease, papillary carcinoma or multinodular goiter. The complete set of experiments shows for the first time a chemical diversity of pathological calcifications but no correlation between the chemical composition of the pathological calcifications and the disease.