

## Processing of tetrahedrite-based thermoelectric materials using tetrahedrite-tennantite copper ores

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Tetrahedrite-based compounds are considered a promising thermoelectric material. The tetrahedrite-tennantite series, that can be generically expressed as  $\text{Cu}_6[\text{Cu}_4(\text{Fe,Zn})_2](\text{Sb,As})_4\text{S}_{13}$ , is one of the most abundant sulfosalt minerals in the earth's crust. The Iberian Pyrite Belt (IPB), located in southern Portugal and Spain, is the host of the largest concentration of massive sulfide deposits worldwide, where the tetrahedrite-tennantite series mineral is one of the constituents. In this work we evaluate the effectiveness of combining synthetic tetrahedrite (ST) with tetrahedrite-tennantite ore samples (TTOS) in the mechanochemical synthesis (MCS) process of tetrahedrite-based compounds. The ore samples were collected from two distinct deposits within the Portuguese part of the IPB, the Neves Corvo mine and the abandoned Barrigão copper mine. The ST, also produced by MCS, were mixed with the TTOS in different mass ratios ranging from 20-80%. The influence of the chemical composition and phase constitution of the ore samples and of the mixing ratios will be presented in relation to the micro-structural properties of the obtained materials. The results here described are part of a broader study dedicated to the development of energy-harvesting applications based on tetrahedrite. This work is funded by national funds through the FCT – Fundação para a Ciência e a Tecnologia, I.P., under the project PTDC/EAM-PEC/29905/2017 (LocalEnergy project, <http://localenergy.lneg.pt>).