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Heavy Metals of Natural Phosphate Ore and the Way They Affect the Various Mineralurgic Modes of Treatment

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Abstract : The study focused on the qualitative and quantitative study of Trace elements contained in the natural phosphate ore of Djebel Onk layer and their behaviour to the various mineralurgic modes of treatment. The main objective is to locate the importance of these contents according to granulometry and their association with the existing mineralogical species and to define how the most appropriate treatment. The raw ore is in first submitted to a prior mechanical treatment consisting of homogenization operations, of grinding and of sifting, in order to separate it into three particle-size classes: fine <100 µm (F); medium 100-500 µm (I) and coarse > 500 µm (G), and then treated by calcination, washing and floatation. The identification of the different mineralogical phases, the chemical composition and the thermal behaviour of these samples were realized by various techniques: MEB, DRX, ATG-ATD, etc. The study of Trace elements, carried out by ICP-MS, identified thirty items, consisting mainly of rare earths and of transition metals. A close relation between trace elements and various minerals phases (apatite, dolomite and silicates), through operations of substitution. These elements are distributed between several mineralogical phases, in particular apatite (strontium, uranium, chrome, barium, cadmium) and silicates (strontium, sodium, nickel, zinc and copper).

Keywords : valorization of natural phosphate ore, heavy metals, qualitative and quantitative analysis, various mineralurgic
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