

the upper layer, and then gradually dispersed in the lower layers by elution absorption processes. Correlation of these findings with known geological data may lead to a better understanding of the relation between uranium and phosphate ores.

### OXIDATION STATES OF URANIUM IN PHOSPHATES AFTER THERMAL TREATMENT<sup>†</sup>

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Uranium in raw phosphate rock occurs in two oxidation states, +4 and +6. The oxidation process which starts at temperatures above 500°C is completed at about 600°C. The oxidation of uranium starts after most of the organic material in the ore has been decomposed, but still before the recrystallization of the apatite. At temperatures above 800°C, uranium concentrates in compounds which are insoluble in cold phosphoric acid, probably calcium uranate. The results are summarized in Table 2.

Table 2

Oxidation states of U in Oron phosphate at various temperatures  
(total U concentration: 100 - 120 ppm)

Temperature (°C)	Heating time (h)	U <sup>+4</sup> (ppm)	U insoluble (ppm)
500	6	38.3	1.85±0.35
500 + O <sub>2</sub>	6	26.2±2.8	3.75±1.4
600	11	7	1.4
700	11	8	3.0
800	4	5.1	9.1±2.5
900	4	7.8	36
900	11	6.0	48
1000	11	5.8	83.3
Raw material	-	42.7±4.9	

<sup>†</sup>This work was supported by the Ministry of Energy and Infrastructure