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NEW DISCOVERIES OF TRR AND RADIOPACTIVE ELEMENTS OF PHOSPHOGYPSUM FROM ROMANIA

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Phosphogypsum is a technogenic product remaining after the extraction of phosphoric acid from raw phosphate, mainly apatite.
Some radioactive elements presented in the phosphate original rock, consisting in apatit, are Ra-226, th-232, U-238, Pb-210, Po-240, K-210, that can be also found in the phosphogypsum. Determination of elements has been carried out on phosphogypsum samples from Turnu Magurele (TR), Valea Calugareasca (VC), Navodari (N) and Bacau (B). The most important minor elements of phosphogypsum are Th and U. The radioactivity of isotopes from Bacau samples of phosphogypsum is: U-238 exceeding (ppm) – 40,50; 31,96; 17,49; 30,00; 31,00 and Th-232 (ppm) - 8,07; 6,07; 6,41; 7,80; 6,41.
The radiometric analyzes confirmed that Bacau county phosphogypsum have higher concentrations of U, while the content in Th is lower. The radioactivity of isotopes from samples of Navodari phosphogypsum is U-238 (ppm) – 37,00; 40,97; 10,84; 25,72 and Th-232 (ppm) – 6,82; 7,04; 6,19; 7,55. The radioactivity of isotopes from Turnu Magurele phosphogypsum samples is: U-232 (ppm) – 1,51; 21,92; 28,71; 6,92, 10,79, 11,00, and Th 232 (ppm) – 3,87; 7,29; 10,65; 6,22; 6,77; 5,45. The radiaoactivity of isotopes from Valea Calugareasca samples of phosphogypsum is: U-238 (ppm) – 17,60; 22,35; 17,93; 18,78 and Th-232 (ppm) – 5,98; 7,12; 7,85; 8,07. As in the case of the phosphogypsum analyzed in Bacau, as well as in the zones TM, VC and N, the radiometric analyzes results indicate a high content of U-232 and lower in Th-232. In conclusion, based on the analyzes carried out on samples of phosphogypsum from the four areas, and the higher U and lower Th contents, it follows that we are dealing with phosphogypsum thet results from a sedimentary type rock.
Inductively coupled plasma - atomic emission spectrometry (ICP-AES) analyses performed on selected samples of phosphogypsum from the four deposits showed that the contents in the main REE (cerium, erbium, neodymium, thorium, ytterbium) are specific for the phosphogypsum issued from the processing of sedimentary raw phosphates.
The results are:
Turnu Magurele – Ce (ppm) - (29,1-663,1); Er (ppm) – (0,9-11,7); La (ppm) – (22,7-469,0); Nd (ppm) – (21,1-260-5); Th (ppm) – (0,3-20,8); Yb (ppm) – (1,1-6,8).
Valea Calugareasca – Ce (ppm) - (30,2-454,2; Er (ppm) – (0,8-7,3); La (ppm) – (35,7-322,5); Nd (ppm) – (22,3-188,2); Th (ppm) – (0,0-12,8); Yb (ppm) – (1,6-5,0).
Navodari – Ce (ppm) – (3,9-165,0); Er (ppm) – (1,8-7,7); La (ppm) – (14,5-135,6); Nd (ppm) – (3,8-90,6); Th (ppm) – (0,8-6,5); Yb (ppm) – (1,8-6,1).
Bacau – Ce (ppm) – (19,3-174,8); Er (ppm) – 13,1-18,8); La (ppm) – (36,2-134,2); Nd (ppm) – (24,5-104,5); Th (ppm) (1,7-5,2); Yb (ppm) – (1,9-6,6).