

## On-line analysis of the mineral materials on conveyer by tagged neutrons method

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Tagged neutron method (TNM) was used for elemental analysis of the mineral materials, (sinter, phosphorus ore, coal etc) on conveyer. The neutron module was situated under the conveyer belt. It comprises the neutron generator with in-built alpha detector and two blocks of gamma-detectors.

The neutron generator is a sealed tube portable neutron generator with a built-in alpha-detector. The generator provides a continuous neutron flux of 14.1 MeV with an intensity of  $5 \times 10^7 \text{ s}^{-1}$ . Power consumption of the neutron generator is 40 W. The lifetime of the generator is 800 hours. The built-in silicon alpha-detector is a  $3 \times 3$  matrix with a pixel size of  $10 \times 10$  mm.

To register  $\gamma$ -quanta arising from irradiation of ore by fast tagged neutrons, we used 14  $\gamma$ -detectors based on BGO crystals with a diameter of 76 mm and a thickness of 65 mm. The  $\gamma$ -detectors was placed in two thermostat modules.

For analysis, the gamma spectrum of each sample was decomposed into individual components by fitting it with the sum of the reference gamma spectra from 8 elements: Si, Mg, Fe, Al, Ca, C, O, P, which were measured in advance.

Thus, the mass concentration of an individual element was initially determined, then, for comparison with the data of chemical analysis, a conversion into masses of oxides was made.

The results of measurements are discussed.