

## Spectrometric amplifier based on commercially available operational amplifiers for alpha spectroscopy

Radioactive contamination appearing after the explosion of atomic bombs, the decay of U238 into Ra226 in nature, radioactive contamination from accidents at nuclear power plants such as the one in Fukushima require the creation of accessible and fast methods of environmental monitoring of soil, water and air pollution [1,2,3].

Alpha spectroscopy allows you to identify the source of radioactive contamination by recording alpha particles emitted during the decay of an isotope. To detect alpha particles, semiconductor silicon detectors and scintillation crystals are used.

Since the signal caused by the passage of an alpha particle on the detector is small in amplitude and width, amplification of this signal with a charge-sensitive preamplifier is required. The signal from the preamplifier is long in width and can reach from 100 to 1000 microseconds, which causes signals to overlap each other. Therefore, the next element after the preamplifier is a spectrometric amplifier that converts the signal into a short half-Gaussian form of 2-5 microseconds.

In this work, a spectrometric amplifier was designed based on two commercially available operational amplifiers OPA354 and OPA8605.

The advantages of using operational amplifiers are their low noise, high slew rate and bandwidth, and compact size.

### References

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### Section

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