

NOVEL SILICON DRIFT DETECTORS WITH ENHANCED RELIABILITY FOR INCREASING REQUIREMENTS OF ANALYTICAL APPLICATIONS

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Silicon Drift Detectors (SDDs) are commercially available for more than 10 years. They are widely used in XRF, TXRF, electron microprobe analysis systems, and synchrotron applications.

To meet the increasing requirements of the X-ray analytics market, KETEK developed a new generation of silicon drift detectors with an enhanced reliability and robustness. Furthermore, the new VITUS-SDDs have both the productivity and convenience of conventional SDDs and the analytical quality of Si(Li) detectors.

Si(Li) detectors showed for many years a continually improved background, peak shape and low energy performance. Now the VITUS-SDDs show an excellent performance, like energy resolutions of 128 eV, peak-to-background ratios up to 20,000 and peak-to-tail ratios up to 5,000. Furthermore, these VITUS-SDDs have this good performance nearly independent of the sensitive area. The results of SDDs with up to 100 mm² are presented.

The optimized entrance layers of the SDD chip are very robust against radiation hardness and contaminations like water layers. Corresponding stress tests and the influence on the spectrum are presented.

Superior results after aggressive tests prove the excellent long-term stability and assure a very large MTBF (mean time between failures).