

Large Area Silicon Drift Detectors

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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.

The big benefit of SDDs compared to other x-ray detectors as Si(Li)s or pin-diodes is the spectroscopic performance principally being independent of the sensitive area. As there is a growing demand for larger detector areas, KETEK has developed SDDs with active areas up to 100 mm².

We will present spectroscopic measurements of SDDs with areas varying from 10 to 100 mm². Energy resolution below 130 eV for the Manganese K α line and peak to background values of more than 10,000 will be shown for devices with active areas of 100 mm² when cooled down to -60°C. Count rate dependency of the energy resolution and the peak position is shown to be negligible up to count rates of 100,000 counts per second.

Temperature dependent measurements of the energy resolution will be shown for different detector areas. We will present improved cooling techniques for KETEK VITUS modules which allow detector temperatures down to -50°C at an ambient temperature of +20°C. Energy resolutions below 135 eV for 100 mm² SDDs and 130 eV for 30 mm² devices at -50°C are achieved.