

XRF Detector System with hermetically closed silicon drift detector modules for high resolution spectroscopy in ambient air conditions

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PNDetector is leading in high performance Silicon Drift Detectors (SDD's) for microanalysis. Our own ultra clean production line allows us to produce detectors with very low leakage current levels and integrated FET as first amplifier stage resulting in very low input capacitance values and lowest noise behaviour. This results in the excellent energy resolution also at moderate operation temperatures and short shaping times.

For XRF applications the SDD chips are mounted in a completely controllable, hermetically sealed vacuum package with brazed beryllium window to protect them from humidity or contamination.

Planar Thin Windows (PTW), based on a very thin silicon nitride layer, instead of the beryllium window open the possibility to analyze light elements starting from carbon (Fig. 1). Such windows for light element detection have to be glued in the vacuum housing in an optimized process resulting in a nearly hermetic package. The remaining low leakage rates caused by the fact, that organic glue is in no case 100% hermetic dense, can be compensated. The "Complete" Module technology enables monitoring of the vacuum inside the module by a pressure sensor and reactivating the getter, when the getter capacity is reached. A real vacuum housing is the result. This allows to use PTWs also in ambient air conditions and opens the door for light element analysis in XRF applications.

A new XRF Detector System will be presented, which supports the full functionality of the Complete Modules from PNDetector including vacuum sensing and the possibility of getter reactivation. It will be shown that this is the ideal platform to use the hermetically closed SDD Complete Modules and that it provides the known excellent performance of the SDD's with energy resolution down to 123eV @ MnK α at -30°C chip temperature.

In this contribution we will present results showing the excellent performance of the new XRF Detector System as well as results from long term monitoring of the Complete Modules with Planar Thin Windows in comparison to modules with beryllium windows.

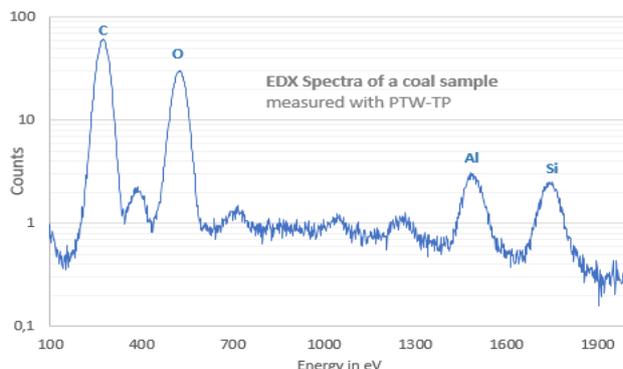


Fig. 1: Example for light element analysis using a Planar Thin Window



Fig. 2: Complete - XRF Detector System