New WDS Technology, modification of a WDS to a SD-WDS for more reliable results and where to next ?

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Wavelength Dispersive Spectroscopy (WDS) systems are very valuable microanalysis systems that exhibit far better spectral resolution than the conventional energy dispersive spectroscopy (EDS) systems [1-3]. The combination of EDS and WDS produces a very powerful analytical technique allowing for excellent Quantitative X-ray Mapping (QXRM) [4-5]. However, with the current design of WDS systems, the electron microprobe operator has to be meticulous in monitoring and checking calibration of WDS parameters such as gas flow proportional counter (GFPC) voltages as well as gas flow, gas purity and gas pressure that will affect the WDS [1-3]. At the end of the day, it is time for the design of the WDS and the utilised components within the WDS system to be changed.

An area to consider is the current use of proportional counters (PC's). The PC's have too many things that can go wrong, causing stability and accuracy problems with WDS analysis. To resolve most of these issues, the proportional counters have been replaced with an Amptek Silicon Drift Detectors (SDD's) [1-3]. The incorporation of an SDD into the WDS, which is referred to as either SD-WDS or WDS-SD, in the light element range, allows improvement of our detection limit for these elements, and in addition, obtains improvements in the mid-range elements [1, 2]. Another important feature, with the SDD, is that it is possible to obtain more reliable results at high count rates with a lot less drift in gain and zero.

Our current research demonstrates the dramatic superiority of SDD over a proportional counter detector and once in operation reveals the many benefits as well as removing many artifacts allowing for higher accuracy WDS analysis. The WDS design modifications implemented (SD-WDS or WDS-SD), the improvement in the system performance and subsequent results from various samples will be presented.

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