

Background Reduction in Proportional Counter

Heikki Sipilä, Erkki Kiuru, Tor Andersson
 Metorex International Oy, Nihtisillankuja 5, 02631 Espoo, Finland

Introduction

Low energy tail under the peak is a major problem in trace element analysis. In the case of proportional counter it originates from the wall effect, which will cause partial charge collection from the events near the detector wall.

Developed solution

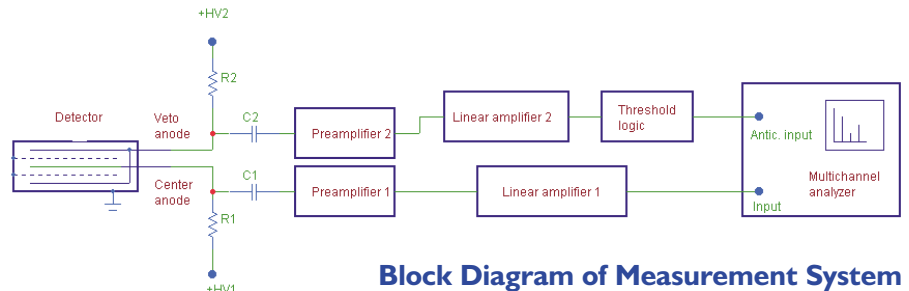
Active detector volume is surrounded by thin anticoincidence shield. When charge is divided between center detector and anticoincidence shield, pulse is rejected.

Conclusion

In the case of Ne-filled detector peak to background improved from 1/65 to 1/1000. In trace element analysis this magnitude of improvement is significant.

References

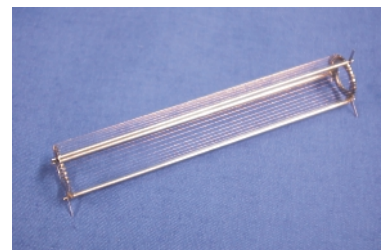
1. H.Sipilä and E.Kiuru, Advances in X-ray Analysis, Vol.20(1977), A New Method for the Elimination of the Wall Effect in Proportional Counter
2. Heikki Sipilä, Advances in X-ray Analysis, Vol.24.(1981), Improving the Detection Limit in Wavelength Dispersive XRF
3. Marja-Leena Järvinen and Heikki Sipilä, Advances in X-ray Analysis, Vol.27(1984), Wall Effect and Detection Limit of the Proportional Counter Spectrometer
4. Patent Pending



Block Diagram of Measurement System



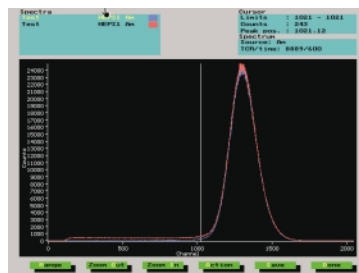
Virtual Cathode of Center Detector



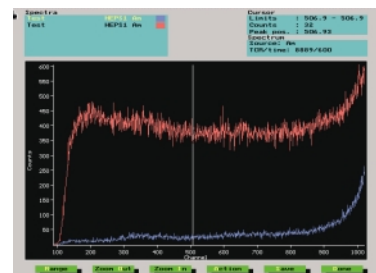
Mounting of Cathode Wires



The Low background Detector



Fe-55 Spectrum
 Red: original
 Blue: Anticoincidence Spectrum



Fe-55 Spectrum
 Background Expanded



Heikki Sipilä, Dr. Tech.
 Chief Technology Officer
 Space Division

Tel. Dir.: +358 9 3294 1320
 Mobile: +358 40 505 8462
 Fax: +358 9 3294 1301
 E-mail: heikki.sipila@metorex.com

Metorex International Oy
 P.O. Box 85, Nihtisillankuja 5
 FIN-02631 Espoo, Finland
 www.metorex.com