

## WAVELENGTH-DISPERSIVE X-RAY FLUORESCENCE SPECTROMETRIC DETERMINATION OF SELENIUM IN CARBONACEOUS MATTER OF ROCKS

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### Abstract

Selenium is used in producing photocells and exposure meters for photographic use and solar cells, to convert a.c. electricity to d.c. and in rectifiers, for electronic and solid-state applications, in photocopying, to decolourise glass and to make ruby-coloured glasses and enamels, and as a photographic toner additive for stainless steel.

The carbonaceous matter in some sandstones is known to contain selenium. The paper proposes a simple, accurate, precise, rapid, and non-destructive wavelength-dispersive x-ray fluorescence spectrometric technique for determining selenium in the carbonaceous matter of rocks. The technique uses a sequential x-ray fluorescence spectrometer, 100 kV – 80 mA -3 kW x-ray generator, silver x-ray tube, LiF 220 analysing crystal, fine (150 µm) collimator, air path, scintillation detector, short counting times, and synthetic standards prepared from spectrographically-pure carbon and selenium dioxide.

The accuracy of the technique is excellent (within 0.5 percent) and the precision is also excellent (within 1 percent). The lower limit of detection is 2 ppm. The time taken for determining selenium in a batch of twentyfour samples of the carbonaceous matter of rocks, for a replication of four analyses per sample, by one operator, using a manual wavelength-dispersive x-ray fluorescence spectrometer is only eight hours.

*Keywords:* X-ray fluorescence spectrometry, WDXRFS, Carbonaceous matter of rocks, Selenium.

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