

ANALYSIS OF SULFUR IN COALS BY X-RAY FLUORESCENCE

Martin Berman and Sabri Ergun

Solid State Physics Group, Pittsburgh Coal Research Center
U.S. Bureau of Mines, Pittsburgh, Pennsylvania

ABSTRACT

Determination of the sulfur content of coals by X-ray fluorescence has been investigated. For preliminary studies on sulfur in both organic and pyritic forms, known amounts were added to sulfur-free carbon black.

Pyrite particle size was found to have a significant effect on fluorescence intensities. At constant pyrite content, fluorescence intensity gives a good measure of pyrite particle size in the range from 2 to 150 microns. For determination of sulfur content, samples must be ground to less than 2 microns.

The ratio of sulfur $K\alpha$ and $K\beta$ fluorescence emission is quite dependent on sulfur concentration but almost independent of bonding or sulfur form. The alpha to beta ratio thus is a very good measure of the sulfur concentration, requiring no standard or correction for changes in intensity of the X-ray beam. The alpha to beta ratio, in combination with the $K\alpha$ reading, permits a determination of total sulfur as well as the percentage in pyritic form.

A program is now in progress to determine the sulfur content of over 100 American coals by X-ray fluorescence.