SOMKIET AUNVONG : DETERMINATION OF ASH CONTENT IN LIGNITE USING X-RAY BACKSCATTERING TECHNIQUE : ASST. PROF. NARES CHANKOW, M.Eng. 70 PP.

The use of x-ray backscattering technique for lignite ash determination was studied. A 1.11 GBq annular plutonium-238 x-ray source and an x-ray proportional counter were used. A HPGe detector was also used to investigate the x-ray spectra in more detail. The optimum sources-to-sample distance, the minimum sample thickness and diameter were determined so as to obtain maximum backscattered x-ray intensity. It was found that the optimum distance was 9 mm whereas the minimum sample thickness was 2.1 g/cm^2 and the minimum sample diameter was less than 4.8 cm. The effect of particle size on measurement of the backscattered x-rays was also studied. It was found that the standard deviation of the measurement was directly proportional to the particle size and the standard deviation was less than 1 percent for the particle size less than 0.833 mm which was comparable with that obtained from pulvurized and compressed samples. The relationship between the backscattered x-ray intensity and ash content in lignite sample was investigated by using 34 samples with percentage of ash ranging from 14 to 65 percent. The results indicated that the backscattered x-ray intensity was inversely proportional to ash content in the sample with the correlation coefficient of 0.97. For ash content ranging from 14 to 30 percent, it was found that an increase of 1 percent iron content resulted in an increase in the reading of ash content by less than 1.2 and 5 percent respectively whereas an increase of 1 percent moisture content resulted in a decrease in the reading by less than 0.2 and 2 percent respectively.

The ash content of 8 lignite samples with ash content ranging from 24 to 45 percent was determined and the results were comparable with those obtained from chemical analysis and gamma-ray transmission technique with the correlation coefficients of 0.92-0.95.