

RADIOMETRIC METHOD FOR DETERMINATION OF A HEATING VALUE OF
DOMESTIC COALS

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Determination of a heating-value of coals is based on the continuous measurement of the transmitted gamma-ray through a coal sample. This method provides faster control of the quality of coals comparing with other methods used by coal analyser laboratories. In the mentioned standard method the accuracy depends on sampling, sample preparation, burning the sample and data processing. The time interval for the process lasts many hours, sometimes many days. Also, the information about the quality of a large quantity of coal is given by the small quantity of the tested coal sample.

The method, based on the application of radiosotop sources to the analyses of the quality of coal, described in ref. (1,2), is modified and applicated for our coals.

For a radioactive source ^{241}Am is chosen, because of the half-life ($T_{1/2}=433$ years) and the low-energy gamma-ray ($E_{\text{gamma}} = 59.6$ KeV). The source was placed in a lead container with a colimator on the top. The narrow beam passing through a coal sample, was detected by a NaI(Tl) detector. The detected radiation intensity depends on a mixture of chemical compounds, SiO_2 , Fe_2O_3 , Al_2O_3 , CaO , MgO , SO_3 .

The quantity of the moisture in the coal sample has been investigated by a capacity measurement. The change of 50% of the capacity corresponds to the change of 5% of the moisture.

The heating value can be calculated by the formula.

$$H_d = H_s \left(1 - \frac{W}{100} \right) - 25 W$$

where:

H_d (KJ/kg) - the heating value for wet coal,

H_s (KJ/kg) - the heating value for dry coal,

W (%) - the moisture of the coal sample.

This formula can be also graphically presented in the Fig., in corresponding units.

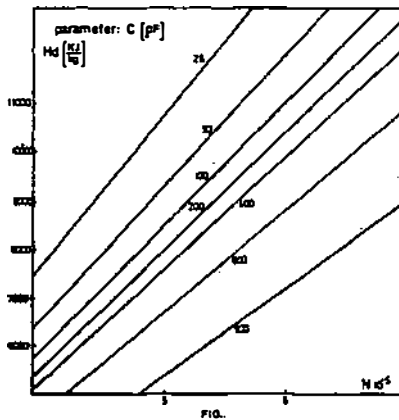


FIG.

References

1. Vogel. A

SEV, Varna, 15-20 September, 1975.

2. S. Koch, P. Sugelt, S. Richter

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