"Investigation & Analysis of Coal sample from Industry"

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Abstract - *An experimental procedure, coal samples were analyzed in terms of proximate analysis. The normal coal and laboratory coal samples are burned at laboratory in muffle furnace and the find of the temperature to burn coal and percentage of moisture. The ash of each samples was analyzed in terms of ash composition and ash deposition. Coal is burned at 800°C for 1 hour to 2 hours. Its process completed and after the weight of burned coal i.e. ash so the difference to the weight before the burning and after the burning. The laboratory coal moistures percentage in 50% and the normal coal (lignite coal) moisture's percentage in 30%. So that to find the both coal moisture and ash deposition difference. Traditional way for energy production is coal fired in muffle furnace. Ultimate product of coal fired in furnace is ash. Ash fusion temperature index of slagging and fouling potential resulted as low to medium and last to find difference of both coal i.e. normal (lignite) coal and Charcoal.*

Key Words: coal; ash deposition; muffle furnace.

1. INTRODUCTION

The proximate analysis of coal includes the determination of moisture, volatile matter, ash content. Which are determined in laboratory.The residue left after burning of coal is known as ash. It is generally composed of inorganic substances.1 gm of coal is weighed in a silica basin (w1). Coal is spread with a brush. Then the basin is kept inside a muffle furnace and the temperature is gradually raised unto 800°C. At 800°C the temperature is kept constant and the incineration of coal is completed by heating the coal for an hour at that temperature. After incineration, the basin is allowed to cool and transferred to a desiccator. After sometime the basin is re weighed (W2). Deduction of wi (weight of the basin) from W2 (weight of the basin + ash) gives the amount of ash in the coal. Ash content is expressed in per cent of coal. The volatile matter, sometimes called volatiles consists mainly of the gases and water and tarry vapors evolved from coal when it is heated at high temperature. To determine it, 1 gm of coal is taken in a silica crucible with a porous silica cover. The weight of the silica crucible and coal is wi. The cover is used to avoid oxidation. The coal is then heated for 7 minutes at a constant temperature of 925°C inside a furnace. After heating the crucible is cooled and transferred to desiccators. After few minutes the silica crucible is re-weighed (W2). The difference between wt and w2 gives the amount of apparent volatile matter in thecoal. The actual volatile matter is obtained after deducting the moisture content of the sample. Volatile matter content is expressed in per cent of coal.

2. PROCEDURE

A. For charcoal

A well cleaned silica crucible is weighed empty accurately about 1g of dried powdered coal is taken in the crucible and weighed. Crucible is then placed in a muffle furnace maintained at the temperature of 800c. Where is heated for about half an hour. After 30 min of heating. The crucible is taken out in air then cooled in a dedicator and weighed. The weight of residue left is the weight of ash.

B. For Normal coal (lignite coal)

A well cleaned silica crucible is weighed empty accurately about 1g of dried powdered coal is taken in the crucible and weighed. Crucible is then placed in a muffle furnace maintained at the temperature of 800c. Where is heated for about half an hour. After 1 hour of heating. The crucible is taken out in air then cooled in a dedicator and weighed. The weight of residue left is the weight of ash.
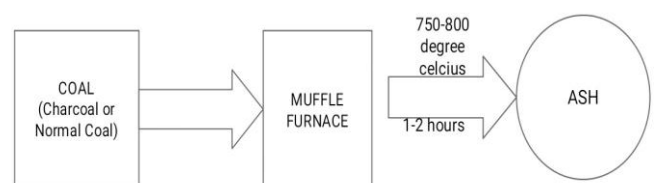

Fig-1 : Block Diagram of ash composition

3. CALCULATIONS

A. For charcoal

Wt of crucible = 14g (W)

Wt of crucible = 15g (W1) (coal =1g)

1. before heating

Temperature = 800c

Wt of crucible + coal = 14.5g (W2)

2. after heating

Loss wt = 15-14.5 = 0.5g

Wt of coal taken = w1-w = 15-14=1g

% of volatile matter = (w1-w2*100)/w1

$\qquad$ = (0.5*100)/1

$\qquad$ = 50%

B. For normal coal

Wt of crucible = 13.5g (W)

Wt of crucible = 14.5g (W1) (coal=1g)

1. before heating

Temperature = 800^0 C

Wt of crucible + coal = 14.5g (W2)

2. after heating

Loss wt = 14.5-13.5 =0.3g

Wt of coal taken = w1-w = 14.3-13.5=1g

% of volatile matter = (w1-w2*100)/w1

$\qquad$ = (0.3*100)/1

$\qquad$ = 30%

CONTENT	WEIGHT OF COAL (g)	TEMPERARURE (degree Celsius)	Percentage of moisture (%)
charcoal	1 g	800	50%
Normal coal (lignite coal)	1 g	800	30%

Table [1] Properties of selected samples

Coal	Dry, Carbon content (%)	Moisture content before drying (%)	Dry, volatile content (%)	Heat Content (MJ/kg
Bituminous	76-86	8-1	14-46	23-33
Sub-Bituminous	70-76	18-38	42-53	18-23
Lignite	65-70	35-55	53-63	17-18
Peat	60	75	63-69	15

Table [2] Category of Coal composition

4. CONCLUSION

The proximate analysis of coal includes the determination of moisture, volatile matter, and ash content. Which are determined in laboratory.The charcoal moisture's percentage in 50% and the normal coal (lignite coal) moisture's percentage in 30%.So that the charcoal moisture's percentage is greater than normal coal.

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