Coal Petrography and Proximate Analysis of K-zone and Q-zone Coal, Mae Moh Mine, Mae Moh District, Lampang Province

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ABSTRACT

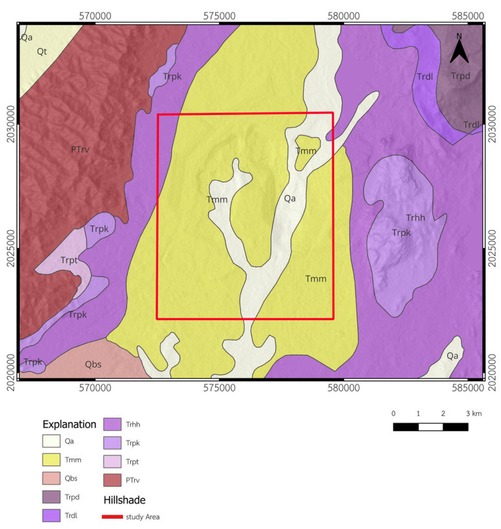
The study investigates the quality and depositional environment of the K- and Q-Zone coals distributed in the C1 pit in Mae Moh mine. Fifteen coal samples were collected: eight from the K-Zone and seven from the Q-Zone. The analysis was conducted through proximate analysis and coal petrography. Proximate analysis results indicate that coal from the K-Zone has an average composition of 18.85 weight percent of moisture, 7.09 weight percent of ash, 33.90 weight percent of volatile matter, and 40.16 weight percent of fixed carbon, while the coal from the Q-Zone contains an average of 16.19 weight percent of moisture, 11.55 weight percent of ash, 34.98 weight percent of volatile matter, and 37.28 weight percent of fixed carbon. These indicate that the K-Zone coals exhibited better quality than the Q-Zone coals due to lower ash content, higher volatile matter, and higher fixed carbon values. However, both coal zones are of good quality, as minimal inorganic mineral contamination implies a depositional environment with limited sediment transport. Coal petrography analysis reveals that both K- and Q-Zone coals are predominantly composed of vitrinite, followed by a moderate amount of liptinite and a discriminate amount of inertinite, with minimal mineral matter. These findings indicated a forest swamp characterized by the accumulation of tree trunks, leaves, and plant spores, with limited sediment influx to the mire.

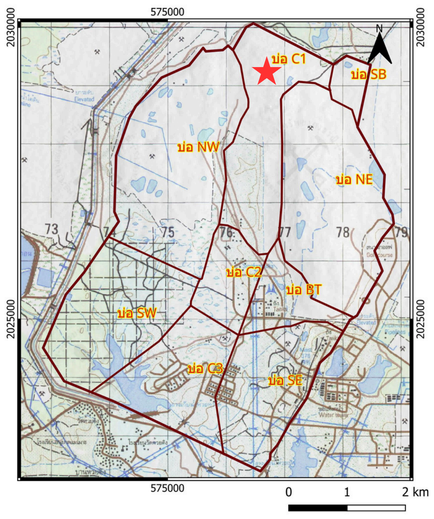
OBJECTIVES

- To analyze the composition of coal based on its petrography.
- To evaluate the quality of coal through proximate analysis.
- To describe the depositional environment of coal in the study area.

STUDY AREA

- Geologic map of study area in Mae Moh Mine
- Mae Moh Mine, Mae Moh District, Lampang Province





METHODOLOGY

Field work

- A total of 15 samples were collected, consisting of 8 samples from the K-Zone coal and 7 samples from the Q-Zone coal.

Petrography

- Polish section
- Analysis of Components Under a Coal Petrographic Microscope

- Analyze the Composition of Coal Using ImageJ Program

Proximate Analysis

- A standard method for determining the main components of coal, including moisture, volatile matter, ash, and fixed carbon.

RESULTS

A total of 15 coal samples were examined, comprising 8 samples from K-Zone and 7 samples from Q-Zone.

- K-Zone

Table 1 : Proximate Analysis Results of K-Zone coal

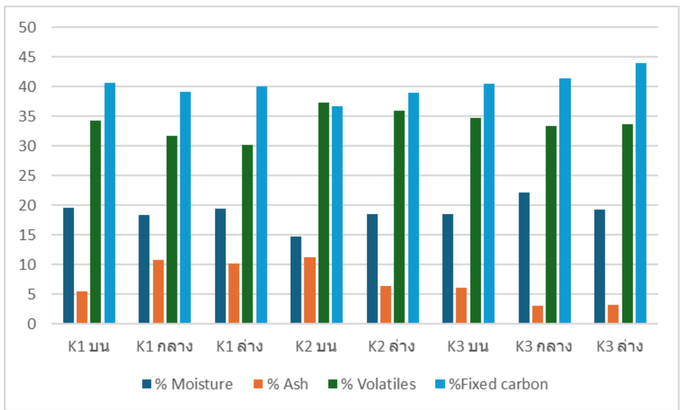
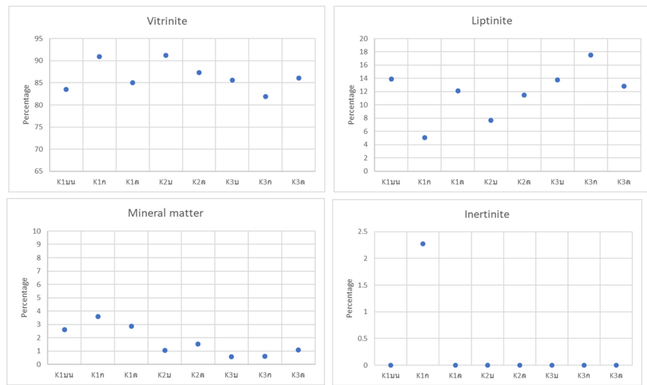
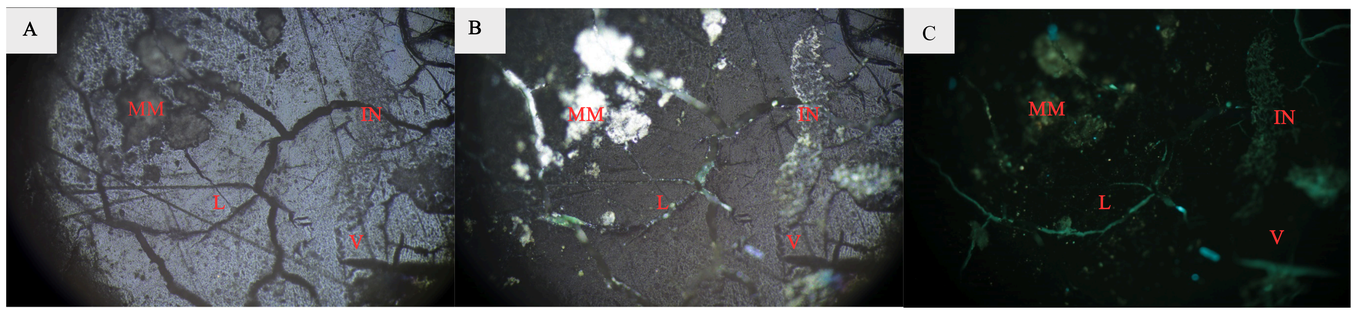


Table 2 : Petrographic results of K-Zone coal





Photomicrographs of K-Zone Coal, Plane 10X, Polarize light (A) Cross Polarized light (B) Fluorescence light (C) Vitrinite (V) Liptinite (L) Inertinite (IN) Mineral matter (M)

- Q-Zone

Table 3 : Proximate Analysis Results of Q-Zone coal

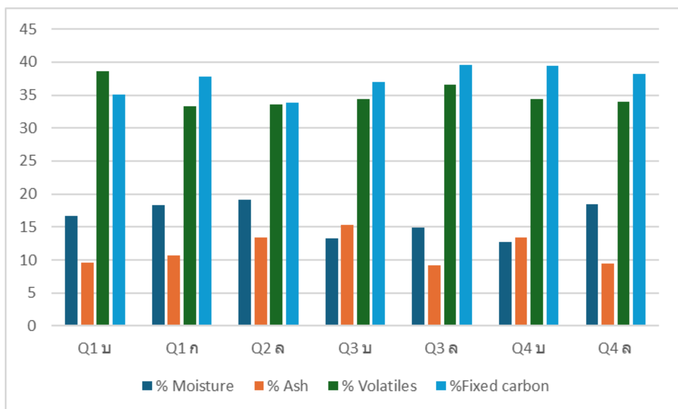
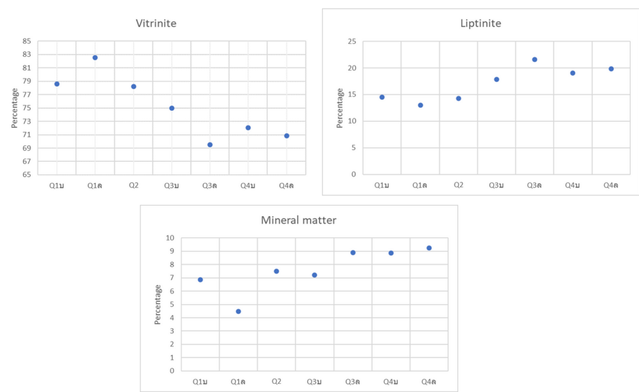
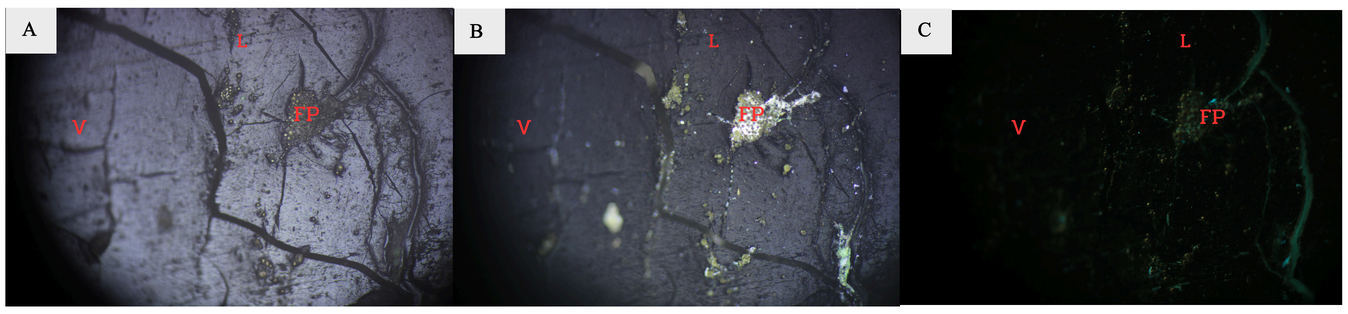


Table 4 : Petrographic results of Q-Zone coal





Photomicrographs of Q-Zone Coal 10X, Plane Polarize light (A) Cross Polarized light (B) Fluorescence light (C) Vitrinite (V) Framboidal pyrite (FP) Liptinite (L)

CONCLUSION

- Coal from K-Zone is of higher quality than that from Q-Zone.
  - This is due to its higher vitrinite and liptinite content, which reflects the accumulation of woody plant debris such as trunks, bark, and leaves.
  - K-Zone contains a lower amount of inorganic minerals than Q-Zone, indicating minimal sediment influx into the basin.
  - Proximate analysis results show that K-Zone has higher moisture content, lower ash content, and higher volatile matter and fixed carbon than Q-Zone, indicating better coal quality.
- Low ash content reflects a low amount of inorganic minerals and the coal's depositional environment.
  - This suggests minimal sediment deposition in the basin.
  - The coal was deposited in a forest swamp environment.

REFERENCE

Department of Mineral Resources. (2007). Geologic map of Lampang. Department of Mineral Resources, Ministry of Natural Resources and Environment, Thailand.
Royal Thai Survey Department. (1999). Topographic Map of Lampang Province, Scale 1:50,000, Sheet No. 4945 IV