

Mineralogy and Geochemistry of coal mines from Akkakhel, Akhorwal, and Sheikhan, KP, Pakistan

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The concentration of major elements and minerals in the coal deposits of Akkakhel, Akhorwal, and Sheikhan areas of Khyber Pakhtunkhwa, Pakistan have been investigated during the present study. For this purpose, six coal mines (two from each study area) were sampled. Elemental and mineral analyses were carried out using Atomic Absorption Spectrophotometer (AAS) and Scanning Electron Microscope (SEM).

The results showed that magnesium (Mg), calcium (Ca), potassium (K), aluminium (Al), silicon (Si), iron (Fe), sodium (Na) and sulfur (S) were relatively higher than the world's coal and upper continental crust. The higher concentrations and mode of occurrence of these elements are attributed to the spinel group minerals, sulfides, carbonates, and clay minerals which are common in all the studied coal deposits. These mineral phases have highly affected the quality of studied coal deposits. The froth floatation technique was used to remove the deleterious mineral phases and the studied coal was up-graded to greater extent. Further, the sulfur has been reduced to considerable level that will contribute in reduction of Sox emission to the atmosphere and a significant reduction in ash as combustion residue. The results obtained during this study will be useful for the industries such as energy, power, space technology, and cement manufacturing.

Keywords: Coalmine; Critical elements; Froth floatation; Kohat; SEM-EDX