

Chemical characteristics of the vent dusts from the underground coal mines in Shanxi Province

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This study focused on the dust in the ventilation of the underground coal mine of Ningwu Coalfield, Shanxi Province, the particle size distribution, mineralogical and geochemical characteristics of the vent dust were studied. The particle size distribution of the vent dusts in the exhaust outlets of the four coal mines studied are similar and characterized by a single peak, which peaked at 3.5-4.0 μm . The minerals in the vent dusts are dominantly composed of kaolinite, followed by illite, quartz, calcite, dolomite, bassanite and anhydrite. Except for the high content of bassanite, the vent dust discharged from YS coal mine presents similar mineral composition to the parent coal. Compared with the parent coal (and UCC), the vent dust is enriched to varying degrees in the major element oxides Fe_2O_3 , CaO , K_2O , Na_2O and MgO , as well as trace elements Sb, Zn, Bi, Cd, Cu, As, W and Pb, especially Sb, Zn, W and As contents increased 1209, 83, 15 and 12.5 times respectively.

The vent dusts emitted from these coal mines mainly comes from the mining of coal seam, a small amount comes from the shotcrete and weathering products of the tunnel gallery, dust flame retardant, and the wear of coal cutters and coal transmission belts. Therefore, it is necessary to strengthen the management of coal mine vent dust emission to ensure that the mine vent pollution-free emissions.