

## **WEATHERING OF ORGANIC MATTER IN TIPS OF BITUMINOUS COAL MINES, PLZEŇ BASIN, CZECH REPUBLIC**

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Weathering of Carboniferous organic matter was studied in spoil tips of coal mines in the Plzeň Basin, 1 to 112 years old. Weathering mechanisms were tested experimentally by low-temperature oxidation at 140°C. Weathering in the tips is manifested by gradual lowering of hydrogen index (HI) Rock Eval and by an increase in the amount of hydrocarbons oxygen derivatives (phenols and cresols) in organic matter pyrolysates. The total amount of pyrolysate decreases in the course of the weathering process. In contrast, the amount of extractable humic acids gradually increases with the length of weathering. The increasing amount of humic substances correlates with the increasing sorption capacity of the substrates deposited. As a result of the highly acid environment in the spoil tips, humic substances are present in the H<sup>+</sup> form. These substances participate in the exchange reactions of cations in the evolving soil profile in the oldest spoil tips only, where gradual increase in pH occurs as a result of the completed pyrite oxidation. As it has been demonstrated experimentally that oxidation proceeds through at least three different stages. In the first stage, the O/C atomic ratio in organic matter increases with the H/C ratio being almost constant. This indicates that oxygen is taken up with no water and carbon dioxide removal. During the second stage of oxidation, the H/C atomic ratio substantially decreases, the O/C ratio being almost constant. This is explained as due to decomposition of oxygenated species, with water and carbon oxides formation being temporarily the dominant chemical reaction. In the third stage, oxygen consumption and reaction product formation are in equilibrium, as evidenced by steady decrease in O/C and H/C atomic ratios in oxidized organic matter.