

QUASI-CRYSTALLOID BIOPOLYMER STRUCTURES FROM THE EXPLOSIVE DANGEROUS COAL PULVER FROM HUNGARY

by

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Samples from explosion dangerous coal mines from the Mecsek region were the subject of our investigations. The coal pulver was prepared with the solvent and oxidizing method used at recent sporomorphs. The ultra-thin section was investigated with a Tesla BS-500 transmission electron microscope, with a resolution of 6 Å. Among the first results, by the TEM method on the highly magnified pictures granular fossil biopolymer units were observed, some arranged into regular pentagonal polygons, fig. 1,2. To study the quasi-crystalloid lattice of the biopolymer structure of the sporoderm, similarly to the partially degraded wall of the recent sporomorphs, the modified Markham rotation (cf. HORNE and MARKHAM, 1972, KEDVES, 1989.) method was used. The rotation method resulted in the following: The C.P.5.A.5.5. type rotation verified the regularity of the fossil basic pentagonal polygon biopolymer unit; fig. 3. In particular the C.P.5.A.5.10. rotation resulted in new points of symmetry, fig. 4. The secondary rotation, C.S.5.X₁5.5., fig. 5,7, and C.S.5.X₁5.5., fig. 6,8, resulted in a deformed form for the first time the PENROSE-unit organized fossil biopolymer structure. Taking into consideration the new results, the reason of the coal pulver explosion may be as follows: As it was established earlier (SZIRTES, 1969) the porosity, e. g. the occurrence of the gas-channels in the coal (fig. 1,2) is important. The explosion of the gas in the channels may be initiated by a flake of fire. The energy of the gas explosion starts the explosion of the quasi-lattice structure of the coal pulver.

The quasi-crystalloid biopolymer structure of the coal pulver is explosive only in dry condition, in this way vaporisation of the mines may diminish the danger. Alkalis may destroy the biopolymer structures, this fact can also be taken into consideration to diminish or eliminate the explosion danger in the mines.

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Plate I.

Figs. 1-8. TEM pictures from the coal pulver, Komló-148 sample, after experiment, No 160; 20 mg coal pulver + 1 ml 2-aminoethanol, temperature 30 C^o, length of time 24^h, washing,

HF dil. for 24^h, washing, embedding in Araldite, ultra-thin sectioning, TEM investigation.

Fig. 1. Negative No 7547, well shown are the gas channels in the coal pulver, and the globular biopolymer units, between them regular pentagonal polygon units also occur, marked with an arrow. Magnification: x200.000.

Fig. 2. Negative No 7548, similarly well shown are the gas channels and the biopolymer units. Magnification: x200.000.

Figs. 3-8. Rotation pictures. Magnification: x500.000.

Fig. 3. C.P.5.A.5.5. rotation picture from the pentagonal polygon biopolymer unit marked in fig. 1 with arrow, negative No 7547.

Fig. 4. C.P.5.A.5.10. rotation picture, negative No 7547.

Fig. 5. C.S.5.X1/1.5.5. secondary rotation picture, negative No 7547.

Fig. 6. C.S.5.X2/1.5.5. secondary rotation picture, negative No 7547.

Fig. 7. C.S.5.X1/1.5.5. secondary rotation picture, negative No 7548.

Fig. 8. C.S.5.X2/1.5.5. secondary rotation picture, negative No 7548.

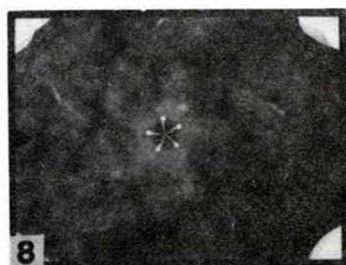
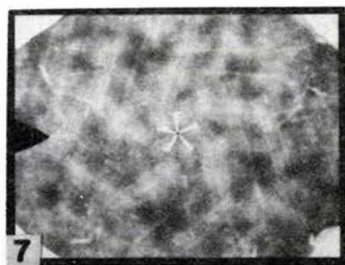
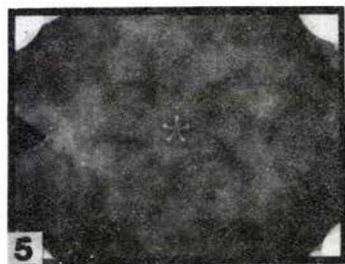
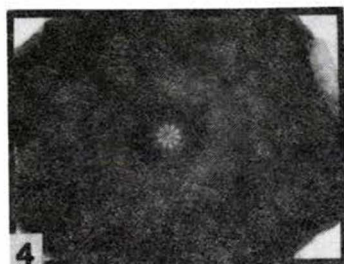
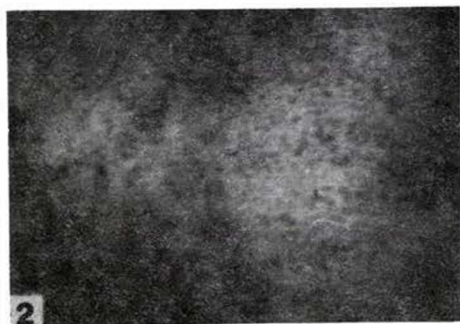
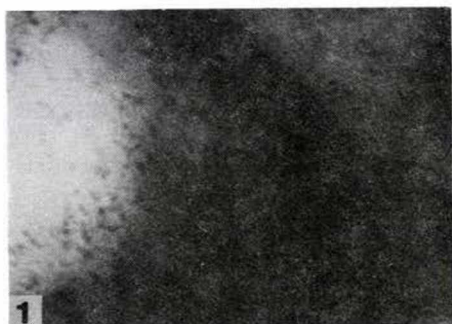


Plate I.

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