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Short Communication

THERMAL AND GROUP ANALYSIS OF PEAT

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Thermal analysis was carried out on peat and its residues after successive separation of water-soluble substances (6.8%), bitumens (3.9%), hemicellulose (5.9%), humic acids (33.4%) and cellulose (21.5%). The primary peat gives two exothermal effects, at 290° and at 275°. After humic acid and cellulose separation, respectively, the second effect decreases and then disappears completely.

In previous work we investigated the infulence of various groups of chemical compounds on the characteristics of the DTA and TG curves of different brown and lignite coals and some of their petrographic ingredients [1–4].

In recent years publications have appeared on the modification of peat organic mass with ammonia [5], the composition of the hydrolyzed products [6] and the mineral mass as the reason for self-combustion [7].

The aim of the present work was to develop the initial investigations, including peat containing different groups of compounds (water-soluble substances, bitumens, humic acids, hemicellulose, lignin, etc.).

Experimental

Raw materials and methods

For the experiment a peat sample from the "Hasselfors" field in Sweden was used. It had the following basic parameters:

Humidity w^a	8.6%
Ash A^d	5.6%
Volatile substances V^{daf}	68.6%
General sulphur S_t^a	0.20%
Carbon C^{daf}	53.1%
Hydrogen H^{daf}	5.5%
Nitrogen N^{daf}	1.3%
Bitumens	3.9%
Tar	13.3%

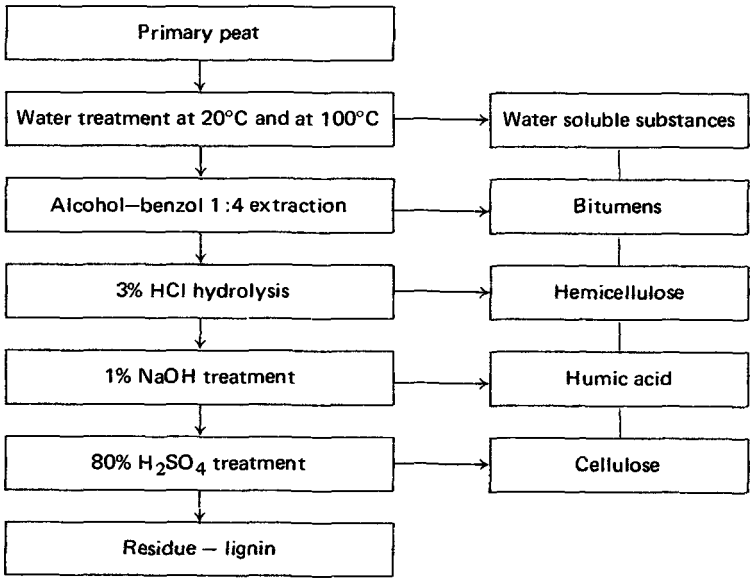

Fig. 1 *Diagram according to which the peat group chenical analysis was carried out*

Figure 1 shows the diagram used for the peat group chemical analysis. An OD-102 apparatus (Hungarian Optical Works, Budapest) was used for the thermal analysis.

Experimental conditions: heating rate: 5 deg/min, inert material: Al_2O_3, sample mass: 60 mg, medium: air.

Results and discussion

Figure 2 shows the DTA and TG curves of the primary peat (a, a′), and its residues after evaporation of the bitumens (b, b′) and the humic acids (c, c′).

Figure 3 shows the DTA curves of the bitumens, humic acids and hemicellulose isolated from peat (curves a, n, c).

Typical of the initial peat DTA curves are the exothermal effects at 290° and at 375°, corresponding to mass changes of the sample (Fig. 2a, a′),

(The intensity of the exothermal effect at 375° decreases significantly after separation of the bitumen, and it disappears totally after separation of the humic acids (Fig. 2, curves b, c). The DTA curve of peat bitumens is characterized by successive exo- and endothermal effects in the temperature range 380–450° and by a large exothermal effect at 480° (Fig. 3, curve a).

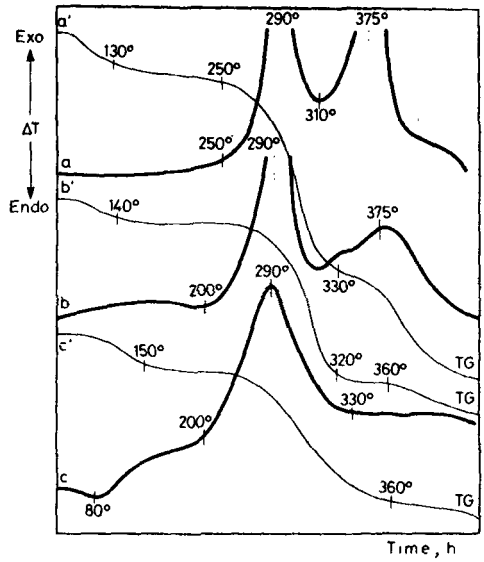

Fig. 2 DTA and TG curves of the primary peat and its residues after the group chemical analysis

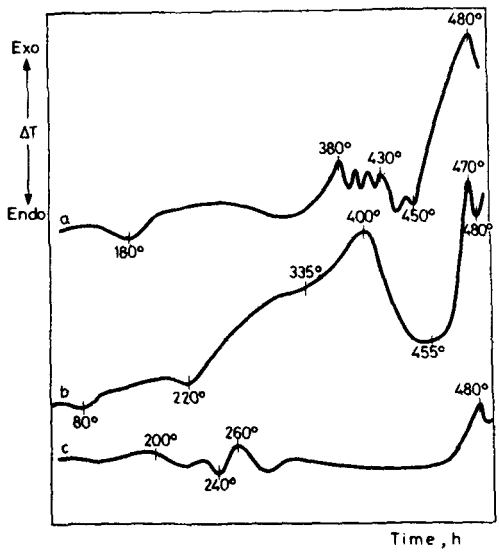

Fig. 3 DTA curves of peat bitumens (a), humic acids (b) and hemicellulose (c)

The exothermal effects at 454° and 480° are typical for humic acids (Fig. 3, curve b).

The DTA curves of the extracted bitumens, humic acids and hemicellulose are absolutely different from those of the primary peat.

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