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Holz als Roh- und Werkstoff

Remanent magnetization of subfossil wood

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Subject: Numerous trunks of subfossil oak up to 9500 B.P. in age were found during stratigraphic studies of Holocene fluviatile deposits laid down in the Labe River flood-plain, Bohemia. Methods used to examine the trunks in a complex way revealed that the oak was a carrier of remanent magnetization. Wood sample was taken from Hradištko for detailed study, its age being estimated at 3975 ± 139 B.P.

Material and Method: Magnetic susceptibility and remanent magnetic polarization were measured in wood specimens on an A.C. bridge (Jelínek 1973) and a spinner magnetometer (Jelínek 1966), respectively. Remanence stability was studied using A.C. and thermal fields. A.F. demagnetization was effected by means of a Schonstedt GSD-1 apparatus; the specimens were subject to thermal demagnetization by means of the MAVACS apparatus (Příhoda et al. 1989). Ferromagnetic minerals were separated from crushed wood by a permanent magnet and identified by X-ray analysis on a Mikrometa II device with a DRON 03 goniometer; the specimens were treated with Co radiation on Fe filter; 30 kW, 18 mA, record 10^3 m · s^{-1}, shift speed 1° · min^{-1}, attenuation 10 dB. The chemical composition of ash was determined preliminarily by emission spectral analysis and the results obtained were used to choose a method suitable for quantitative determination. Ca and Fe contents were measured by titration; P was determined by colorimetry; and atomic absorption spectrometry was used to determine contents of the other elements found in low concentrations. Wood structure and ferromagnetic mineral distribution were determined in polished sections by means of a scanning electron microscope and the Jeol 50 A electron microprobe; thin sections were examined in transmitted polarized light.

Results: Measured values of magnetic susceptibility, $\varkappa_m$, and remanent magnetic polarization modules, J_n, range from 0.1 to $0.9 \cdot 10^{-6}$ [SI] and from 31 to 351 [pT], respectively. The very low values of magnetic susceptibility probably result from the sum effects of diamagnetic substance and ferromagnetic components carrying remanent magnetization. The specimens showed relatively high values of saturated remanent magnetic polarization ranging from 18.5 ro 15.5 [nT]. The analysis of coercivity spectra indicates the presence of ferromagnetic minerals exibiting medium to low magnetic hardness. Their blocking temperature was found to be essentially lower than that of magnetite and haematite, suggesting the presence of iron hydroxides. X-ray analysis of ferromagnetic minerals provided evidence for the presence of goethite and native iron. These components occur in all tissue elements, particularly well visible in earlywood vessels. The chemical composition of the ash content in the fossil wood sample is as follows (in mass %): CaO 50.50, MgO 2.67, Na_2O 0.16, K_2O 0.098, MnO 0.36, P_2O_5 0.31, Fe_2O_3 31.08; metal trace elements [ppm]: Pb 0, Cd 0, Zn 44.22, Li 7.0. A preliminary comparison of the present analytical data with those obtained for the recent wood indicates that the iron content in the subfossil wood is one hundred to one thousand as high as that in the former, but the potassium content is fifty to one hundred times lower.

References

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Acetat- und Formiatgehalte im Splintholz der Kiefer

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Subject: The content of acetate and formiate ions in the sap of spruce sapwood is a function of felling time, tree age, and height of test sample.

Material und Methode: Kiefernbäume unterschiedlichen Alters wurden aus demselben Standort (Forstamt Sprakensehl, Försterei Hagen) zu unterschiedlichen Jahreszeiten (Februar, April und November) gefällt. Unmittelbar danach wurde Saft aus dem Splintholz in unterschiedlicher Baumhöhe herausgepreßt, für den der Gehalt an Ameisen- und Essigsäureanionen bestimmt wurde. Aus den Ergebnissen wurden jeweils Mittelwerte gebildet.

Ergebnisse (s. Tabelle): **1.** Der Gehalt an Ameisen- und Essigsäureanionen im Saft nimmt von Februar bis April hin zunächst deutlich ab und steigt im November wieder an. **2.** Im Februar ist der Gehalt an Formiationen etwa 15mal höher als im April, der der Acetationen ca. 7- bis 10mal. **3.** Anscheinend wird in der Vegetationsperiode (April) durch den starken Transport von Wasser der Gehalt an Acetat- und Formiationen verringert. **4.** Innerhalb des Baums unterliegt der Gehalt an Formiationen Schwankungen und nimmt nach oben hin eher ab als zu.

Veränderungen des Gehaltes an Acetat- und Formiationen (in ppm) im Splintholzsaft der Kiefer in Abhängigkeit von Einschlagzeit, Baumalter und Höhe der Probennahme.

Baumalter (Jahre)	Proben-Höhe (m)		Gehalt an Acetat (A) und Formiat (F) in Abhängigkeit von der Einschlagzeit *		
			Februar	April	Juli
42	0,5	F	405	20	22
		A	111	14	n. b.
	5,0	F	91	7	55
		A	127	10	n. b.
	10,0	F	77	12	62
		A	119	12	n. b.
117	0,5	F	309	15	81
		A	88	12	105
	7,0	F	218	16	68
		A	87	16	163
	14,0	F	258	13	55
		A	83	11	129
142	0,5	F	188	14	n. b.
		A	94	16	n. b.
	8,0	F	82	10	n. b.
		A	110	9	n. b.
	16,0	F	56	9	n. b.
		A	145	20	n. b.

* berechnet als freie Säure in ppm; n. b. = nicht bestimmt