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INFLUENCE OF DIFFERENT ACTIVATION METHODS ON THE CATALYTIC PROPERTIES OF MONTMORILLONITE

Structure and catalytic properties of natural montmorillonite and products of its activation have been studied. The natural montmorillonite has been activated by HCl, HF, KF and NH₄F solutions. One of the samples was also calcined. Chemical, X-ray diffraction and infrared spectroscopic methods have been applied. Catalytic activity of montmorillonite in cracking of cumene has also been studied using microreactor pulse technique. Samples activated with HCl solution and activated using NH₄F solution and then calcined were found to show high catalytic activity.

MIECZYŚLAW ŻYŁA, ZENON KLAPYTA

MODIFICATION OF SORPTION PROPERTIES OF Ni-MONTMORILLONITE WITH HEXADECYLPYRIDINIUM CATIONS

The paper discusses the effect of hexadecylpyridinium (HDP) cations, adsorbed in various amounts on Ni (II)-montmorillonite on sorption properties of that mineral. The obtained complexes, in which Ni²⁺ and HDP cations occupy from 0-100% of exchange positions, were subjected to X-ray IR spectroscopic and sorption investigations. Adsorption of HDP cations up to the 30% occupancy of the exchange positions does not involve changes in the interlayer spacing, $d_{001}=14.3$ Å, typical of Ni-montmorillonite. When about 59% Ni²⁺ are replaced by HDP cations, mixed-layer structures with one and two layers of organic substance may form. Complete substitution of Ni²⁺ by HDP cations gives rise to a complex in which the organic cations are presumably arranged obliquely to the surface of montmorillonite sheets. As the content of HDP cations on the exchange position of Ni-montmorillonite increases, its sorption capacity to water and methyl alcohol vapours decreases. A systematic increase in the sorption capacity with respect to benzene vapours has been noted, which indicates that the process of Ni-montmorillonite hydrophobization advances as Ni²⁺ ions are replaced by HDP cations. Argon sorption on the obtained samples of Ni-HDP montmorillonite is not enhanced compared with Ni-montmorillonite. The fact implies that the introduction of HDP cations to the exchange positions does not make the interlayer spaces accessible to argon.

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**STUDIES OF THE FLUORODERIVATIVES OF LAYERS SILICATES
THE EFFECT OF FLUORIDE SOLUTIONS ON THE STRUCTURAL AND
SURFACE PROPERTIES OF MONTMORILLONITE**

The nature of structural changes of montmorillonite effected by ammonium fluoride solutions have been investigated and the degradation processes of that mineral analysed. The effect of activation conditions on some physico-chemical properties of the reaction products have been determined basing on X-ray, IR spectroscopic and electron microscope investigations, as well as on measurements of argon, n-hexane and methyl alcohol vapour sorption.

MIECZYŚLAW ŻYŁA, WITOLD ŻABIŃSKI

'PRELIMINARY INVESTIGATIONS OF SORPTION PROPERTIES OF STILBITE

Investigations of sorption properties were carried out on two stilbite specimens, from Strzegom (Poland) and Iceland. Sorption and desorption isotherms for argon and water, methyl alcohol and benzene vapours were determined. It has been found that water sorption isotherms are well above isotherms obtained for the other adsorbates.

GRAŻYNA CICHON

SEPIOLITE FROM RUDNO

The paper presents the results of microscopic and X-ray examinations as well as of thermal infrared spectroscopic and chemical analyses of sepiolite which occurs as a secondary mineral in the melaphyres of Rudno near Krzeszowice. Sepiolite from Rudno is a very fine-crystalline variety exhibiting fibrous habit. Its structural formula is : $(\text{Si}_{11-73}\text{Al}_{0,27})(\text{Mg}_{7,67}\text{Fe}^{3+}_{0,15}\text{Al}_{0,16})\text{O}_{30}[\text{OH}]_4[\text{OH}_2]_{3,70}\text{Ca}_{0,12}\text{K}_{0,04}\text{Na}_{0,10} \cdot n \text{H}_2\text{O}$. In the samples studied sepiolite is often accompanied by saponite and frequently also by quartz and calcite.

TADEUSZ RATAJCZAK, STANISŁAW WITCZAK,
DOMINIK S. KULGAWCZUK, JANUSZ KRACZKA

**STUDIES OF THE NATURE OF IRON COMPOUNDS IN WELL-ENCRUSTING
SEDIMENTS**

Chemical and thermal analyses electron microscopy , X-ray diffractometry as well as IR spectroscopy and Mossbauer spectroscopy were employed to investigate the composition and structure of well-encrusting sediments. Special attention was paid to iron compounds which make up the body of the sediments , appearing as goethite hydrated haematite hydrated goethite and syderite. Gel $\text{Fe}(\text{OH})_3$ may also be present in the sediments . It has been found

that the content of iron mineral compounds (in wt.%) is : a -FeOOH 27-29, a -FeOOH nH₂O about 18, a -Fe₂O₃ nH₂O- 44, FeCO₃- 8-12. Iron minerals appear in fine-dispersive forms showing disarranged internal structure. For goethite the size of crystallites was calculated and the following results obtained : length 100-500 Å thickness about 19 Å dimension in the direction perpendicular to (110) plane - about 39 Å.

WIESŁAW HEFLIK, MAREK MUSZYŃSKI

**APATITE FROM DIABASES PENETRATED BY THE BOREHOLE KUROWO-2
NEAR KOSZALIN
(WEST POMERANIA)**

The content of apatite in diabases from the borehole Kurowo-2 (NW Poland) ranges from 0.5 to 5.8 vol.%. Apatite was separated from the rock and subjected to X-ray, IR spectroscopic and chemical investigations. It has been found that it is fluorine apatite. It contains no substantial isomorphous admixtures, admitting only little substitution of fluorine by OH-groups.

ANDRZEJ MANECKI

AEROMINERALOGY-MINERALOGY OF ATMOSPHERIC DUSTS

This paper deals with mineral composition and origin of atmospheric dusts and their classification. In the present author's opinion, the branch of mineralogy devoted to the problems of natural and artificial dusts should be called aeromineralogy.

JÓZEF NEDOMA, ANNA BOLEK

**COEXISTENCE OF SYMMETRY ELEMENTS IN TERMS OF ABBREVIATED
MATRIX SYMBOLS**

Two symmetry operations described by abbreviated symbols a (D₁M₁N₁P₁) i b (D₂M₂N₂P₂) can. coexist only when $E=M_1M_2 + N_1N_2 + P_1P_2$ assumes one of "allowed" values. "Allowed" E-values for given a and b rotation angles are presented in tables.