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Special Paper 1

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Ludlockite: A New Arsenate Mineral

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Ludlockite occurs as red needles associated with zincian siderite in a cavity of ore from the "germanite section" at Tsumeb, Otavi, South-West Africa.

Composition PbO 9.32, FeO 17.50, Fe_2O_3 2.13, As_2O_5 70.82, total 99.77% (by wet chemical analysis). Cell contents (O_{54}) $Pb_{1\ 21}$, $Fe_{7\ 84}$, $As_{17\ 83}$, or 9[(Fe, Pb)$(AsO_3)_2$].

Anorthic, reduced cell a 10.41, b 11.95, c 9.86 Å (±0.2%), α 113.9°, β 99.7°, γ 82.7° (±0.2°), V 1103 A^3 (±0.5%). Nine strongest powder lines: 10.90 Å m, 8.81 vvs (1), 4.74 m (broad), 4.47 m (broad), 3.69 m, 3.33 ms (3), 3.16 ms, 2.935 vs (2), 2.863 ms.

Crystals elongated [100], flattened $\{0\bar{1}1\}$, other prominent form $\{021\}$, no terminal faces. Micaceous cleavage $\{0\bar{1}1\}$, combines with other easy $\{0kl\}$ cleavages to give ready fraying of crystals into fibres. Lamellar twinning, composition plane $\{0\bar{1}1\}$.

Optics almost orthorhombic: biaxial positive, $\gamma \approx a$, optic axial plane $\perp\{0\bar{1}1\}$; $\gamma > 2.11$ (orange yellow), β 2.055 (deep yellow), α 1.96 (yellow). All colours redden rapidly with increasing thickness.

Streak light brown, lustre sub-adamantine. H 1½ −2. D_{obs} 4.40 ± 0.05, D_{calc} 4.35. Sectile and flexible. Loses As_2O_3 on heating above 500°, sublimate in closed tube, becoming yellow, then brown and black. Different DTA curves in air and nitrogen. Readily soluble in strong HCl or HNO_3, more slowly when dilute.

Infra-red absorption and Raman spectra show no signs of isolated AsO_4 or AsO_3 groups, nor of As–O bonds. There are close similarities to the As–O–As bands in the spectra of claudetite (monoclinic As_2O_3), which taken with the other properties suggest a structure based on AsO_6 octahedra with all corners shared.

Type specimens are in the Mineral Collection, British Museum (Natural History); one is promised to the U.S. National Museum of Natural History, Washington D.C.

The name ludlockite is for the New Jersey mineral collectors and dealers Frederick **Ludl**ow Smith III and Charles **Lock**e Key, who generously supplied the specimens that they had found for investigation.

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Beta-Uranophane: A New Occurrence in South West Africa

By S. A. Hiemstra and G. J. Beukes
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Beta-uranophane, a hydrated calcium uranium silicate, occurs in abundance at Rössing, near Swakopmund in South West Africa, and at other places in the Namib Desert. It is a secondary mineral formed from primary uraninite in pegmatite.

The mineral is well crystallized in druses, and occurs as radiated, stellated, and almost parallel groups, and sometimes as botryoidal linings of cavities. It also forms yellow, earthy encrustations.

The mineral is bright yellow, its hardness is 3, and its specific gravity is 4.20.

The crystals show monoclinic prismatic symmetry. The space group is $P2_1/m$, and a is 6.62 Å, b is 15.44 Å, c is 13.94 Å, and β is 91°26′.

The strongest diffraction lines (quoted in angströms) are 7.72(100), 3.86(50), 2.57(35), 1.93(10), 3.18(4), 5.02(3), 3.49(3), 3.34(3), 3.02(3), and 2.59(3).

The crystals are biaxial negative, with strong crossed dispersion, $r > v$, α is 1.664, β is 1.685, γ is 1.694, $2V\alpha$ is 63° (all at 589 nm), and $Z \wedge c$ is 26° at 480 nm and 34° at 622 nm.

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Mordenite in Mordenite Rock From Japan

By H. Minato and M. Utada
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Mordenite with high crystallinity occurs in the form of fiber in cavity of rhyolite or andesite, but in another case, mordenite with low crystallinity occurs commonly as a constituent mineral of mordenite rock which is widely distributed in acidic tuffs of Miocene age in Japan. In the latter case, this mineral is usually associated with clinoptilolite, montmorillonite, celadonite, opal, or quartz. Especially, it is quite similar to clinoptilolite in occurrences as follows: (a) Replacement of vitric materials and precipitation in interstitial spaces. (b) Cementation of clastic grains. (c) Replacement of phenocrystal minerals, especially plagioclase. (d) "Segregation veins." Among them, the first occurrence is predominant.

Several specimens of mordenite which are assumed to be high in purity, were newly analyzed chemically. As the result, the chemical composition of mordenite is characterized by low content of K, compared with that of clinoptilolite, showing in a ternary diagram of the atomic proportions among Ca(+Mg), Na and K. In the field of mordenite, a specimen from Minase is the highest in potassium content. On the other hand, the morecular ratios of Si/Al and Na+K/Ca+Mg+Na+K reveal no composition gap between mordenite and clinoptilolite.

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Leifite, Revised, and Karpinskyite, Discredited

By Harry Micheelsen and Ole V. Petersen
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Leifite from the type locality, Narssârssuk, Greenland, has been found to be a beryllium mineral and its composition has been redetermined by spectrographic analysis, wet micro-chemical analysis, thermogravimetric analysis and electron microprobe measurements.