

Syngenite

$K_2Ca(SO_4)_2 \cdot H_2O$

©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Monoclinic. *Point Group:* $2/m$. As crystals, tabular on {100} to prismatic along [001], with many forms recorded, to 14 cm; forms lamellar aggregates and crystalline crusts. *Twinning:* Contact twins on {100} common.

Physical Properties: *Cleavage:* On {110} and {100}, perfect; on {010}, distinct. *Fracture:* Conchoidal. Hardness = 2.5 D(meas.) = 2.579–2.603 D(calc.) = 2.575 Soluble in H_2O , with separation of gypsum.

Optical Properties: Transparent to translucent. *Color:* Colorless, milky white, faintly yellow due to inclusions; colorless in transmitted light. *Luster:* Vitreous. *Optical Class:* Biaxial (-). *Orientation:* $Z = b$; $X \wedge c = -2^\circ 17'$. *Dispersion:* $r < v$, very strong. $\alpha = 1.501$ $\beta = 1.517$ $\gamma = 1.518$ $2V(\text{meas.}) = 28^\circ$

Cell Data: *Space Group:* $P2_1/m$. $a = 9.77$ $b = 7.15$ $c = 6.25$ $\beta = 104.0^\circ$ $Z = 2$

X-ray Powder Pattern: Synthetic.
2.855 (100), 3.165 (75), 5.71 (55), 2.741 (55), 2.827 (50), 9.49 (40), 4.624 (40)

Chemistry:	(1)	(2)
SO_3	49.04	48.75
MgO	0.64	
CaO	16.97	17.08
K_2O	28.03	28.68
H_2O	5.81	5.49
Total	100.49	100.00

(1) Kalush, Ukraine; corresponds to $K_{1.97}Ca_{1.00}(SO_4)_{2.03} \cdot 1.07H_2O$. (2) $K_2Ca(SO_4)_2 \cdot H_2O$.

Occurrence: An uncommon diagenetic component of marine salt deposits; a volcanic sublimate or pneumatolytic reaction product; a hydrothermal vein filling in a geothermal field; derived from bat guano in caves.

Association: Halite, arcanite (salt deposits); biphosphammite, apthitalite, monetite, whitlockite, uricite, brushite, gypsum (caves).

Distribution: In Ukraine, large crystals from the Kalush salt deposit (Kalusz, Poland), and at Stebnyk. In Germany, from Thuringia, in the Glückauf mine, near Sondershausen, from Bischofferode, and at Volkenroda-Pöther, near Mühlhausen; from the Stassfurt salt district, Saxony-Anhalt; in the Sigmundshall mine, Bokeloh, and at the Kalkberg, near Lüneburg, Lower Saxony. On Vesuvius, Campania, and in the Cesano geothermal field, Latium, Italy. From Haleakala volcano, Maui, Hawaii, USA. In Murra-el-elevyn, Dingo Dongo, and Petrogale Caves, Western Australia. From Gcwihaba Cave, 280 km west of Maun, northwestern Botswana. On volcanoes on the Kamchatka Peninsula, Russia. Around Mt. Erebus, Victoria Land, Antarctica. From the "Q" Basin [Jiangnan Plain] potash deposits, Hubei Province, China.

Name: From the Greek for *related*, for the chemical resemblance to polyhalite.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 442–444. (2) Corazza, E. and C. Sabelli (1967) The crystal structure of syngenite, $K_2Ca(SO_4)_2 \cdot H_2O$. Zeits. Krist., 124, 398–408. (3) Boki, G.B., N.A. Pal'chik, and M.Y. Antipin (1978) Crystal structure of syngenite. Kristallografiya (Sov. Phys. Crystal.), 23, 257–260 (in Russian). (4) Cavarretta, G., A. Mottana, and F. Tecce (1983) Görgeyite and syngenite in the Cesano geothermal field (Latium, Italy). Neues Jahrb. Mineral., Abh., 147, 304–314. (5) (1977) NBS Mono. 25, 14.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Mineral Data Publishing.