Brochantite $Cu_4(SO_4)(OH)_6$

©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals are typically thick prismatic to acicular, elongated along [001] or [010], to 5 cm; may be flattened [001]; about 40 forms known; in aggregates, druses, crusts, also massive, granular. *Twinning:* On {100}, common, giving a pseudo-orthorhombic appearance.

Physical Properties: *Cleavage:* On {100}, perfect. *Fracture:* Uneven to conchoidal. Hardness = 3.5–4 D(meas.) = 3.97 D(calc.) = 4.09

Optical Properties: Transparent to translucent. *Color:* Emerald-green, blackish green, pale green; bluish green in transmitted light. *Streak:* Pale green. *Luster:* Vitreous, somewhat pearly on cleavages.
Optical Class: Biaxial (–). *Pleochroism:* Slight; in bluish greens. *Orientation:* $Y = b$; $X \simeq a$; $Z \simeq c$. *Dispersion:* $r < v$, medium. $\alpha = 1.728$ $\beta = 1.771$ $\gamma = 1.800$ 2V(meas.) = 77(2)°

Cell Data: *Space Group:* $P2_1/a$. $a = 13.08$ $b = 9.85$ $c = 6.02$ $\beta = 103°22'$ Z = 4

X-ray Powder Pattern: Locality not stated. (ICDD 13-398).
2.521 (100), 3.90 (85), 2.678 (50), 6.38 (40), 5.36 (40), 3.19 (40), 2.923 (20)

Chemistry:

	(1)	(2)
SO_3	17.54	17.70
CuO	70.29	70.35
H_2O	11.96	11.95
Total	99.79	100.00

(1) Collahuasi, Chile; average of two analyses. (2) $Cu_4(SO_4)(OH)_6$.

Occurrence: Common in the oxidized zone of copper deposits, yet rarely an ore; formed under low acidity, principally in arid regions.

Association: Malachite, azurite, tenorite, cuprite, linarite, caledonite, cerussite, atacamite, chrysocolla, cyanotrichite, iron oxides.

Distribution: In Russia, from the Mednorudyanskoye copper deposit, near Nizhni Tagil, and at Gumeshevsk, southwest of Yekaterinburg (Sverdlovsk), Ural Mountains. At Băiţa (Rézbánya), Romania. From Rosas and Sa Duchessa, Sardinia, Italy. In Germany, at the Clara mine, near Oberwolfach, Black Forest. In England, numerous occurrences in Cornwall, and at Roughton Gill, Cumbria. From Tsumeb, Namibia. At Aïn-Barbar, Constantine, Algeria. In Australia, at Broken Hill, New South Wales. From many occurrences in Chile, as at Chuquicamata and Collahuasi, Antofagasta; from Potrerillos, Atacama; and at Challacollo, Tarapacá. In the USA, in Arizona, large crystals from Bisbee, Cochise Co., and at the Mammoth-St. Anthony mine, Tiger, Pinal Co.; in the Mammoth mine, Tintic, Juab Co., Utah; at Bingham, Socorro Co., New Mexico; from the Cerro Gordo mine, Inyo Co., California; in the Douglas Hill and Mason Pass mines, Yerington district, Lyon Co., Nevada. Many other localities are known.

Name: Honors Professor André Jean François Marie Brochant de Villiers (1772–1840), French geologist and mineralogist, School of Mines, Paris, France.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 541–544. (2) Cocco, G. and F. Mazzi (1959) La struttura della brochantite. Period. Mineral. 28(2–3), 9–149 (in Italian with English abs.). (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow, 46.

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.