Graemite $CuTe^{4+}O_3 \cdot H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As divergent bladed crystals, with {100}, {010}, {001}, {021}, to 8 mm.

Physical Properties: *Cleavage:* On {010}, good; on {100}, a parting. *Tenacity:* Brittle. Hardness = 3–3.5 D(meas.) = 4.13(9) D(calc.) = 4.24

Optical Properties: Translucent. *Color:* Blue-green, jade-green. *Streak:* Pale blue-green. *Luster:* [Vitreous.]
Optical Class: Biaxial (+). *Pleochroism:* Moderate; X = yellowish green; $Y = Z$ = blue-green. *Orientation:* $X = b$; $Y = c$; $Z = a$. *Absorption:* $Y > X = Z$ $\alpha = 1.920(3)$ $\beta = 1.960(3)$ $\gamma = 2.20(0.5)$ 2V(meas.) = n.d. 2V(calc.) = 48.5°

Cell Data: *Space Group:* *Pcmm* (probable). $a = 6.805(6)$ $b = 25.613(15)$ $c = 5.780(6)$ Z = 10

X-ray Powder Pattern: Cole shaft, Arizona, USA.
6.395 (10), 3.434 (8), 12.803 (5), 2.558 (5), 2.873 (4), 2.343 (4), 5.640 (3)

Chemistry:

	(1)	(2)
TeO_2	61.2	62.06
CuO	31.0	30.93
H_2O	8.2	7.01
Total	100.4	100.00

(1) Cole shaft, Arizona, USA; average of three analyses, H_2O by the Penfield method, average of two determinations, $(TeO_3)^{4+}$ confirmed by microchemical tests; corresponds to $Cu_{0.98}(TeO_3)_{0.96} \cdot 1.14H_2O$. (2) $CuTeO_3 \cdot H_2O$.

Occurrence: A rare dehydration product of teineite, as pseudomorphs and incrustations.

Association: Teineite, malachite, cuprite (Cole mine, Arizona, USA); teineite, malachite, brochantite, djurleite, bornite, weissite, gold, goethite (Dome Rock Mountains, Arizona, USA).

Distribution: In the USA, in Arizona, from the Cole shaft and in the Shattuck mine, Bisbee, Warren district, Cochise Co., and in the Dome Rock Mountains, La Paz Co.

Name: Honors Richard Graeme (1941–), American mining engineer and mineral collector, Phelps Dodge Corporation, USA, who found the first specimen.

Type Material: n.d.

References: (1) Williams, S.A. and P. Matter III (1975) Graemite, a new Bisbee mineral. Mineral. Record, 6, 32–34. (2) (1975) Amer. Mineral., 60, 486 (abs. ref. 1).