

## GRUNERITE



(see also cummingtonite)

A member of the amphibole group, grunerite is the iron-rich member of the cummingtonite-grunerite series. It is found almost exclusively in metamorphosed iron formations. It is commonly needle-like and often forms spheroidal aggregates that resist weathering, giving the rock a nodular surface. Northern Peninsula.



Figure 85: Radiating crystals of grunerite in magnetite from near Michigamme Lake, Marquette County. Field of view 2.5 x 3.5 cm. A. E. Seaman Mineral Museum specimen No. DCG 381, Jeffrey Scovil photograph.

**Baraga County:** 1. Ohio mines, Imperial Heights: With hematite, goethite, carbonates, sulfides, graphite, and palygorskite. 2. Spurr mine, Imperial Heights: With chloritized almandine and magnetite (1, 2, Morris, 1983).

**Dickinson County:** 1. SW corner of section 5, T41N, R30W; W ¼ section 36, T42N, R30W; and the SE ¼ section 33, T42N, R28W: Grunerite-magnetite-garnet rock in the Felch Formation. 2. Groveland mine. Grunerite rock occurs in Vulcan Iron Formation (1, 2, James et al., 1961).

**Gogebic County:** Gogebic iron range in general: Ironwood Formation includes grunerite schist (Van Hise and Leith, 1911).

**Iron County:** 1. Lake Mary quadrangle: Found in the Mansfield iron slate member of the Hemlock Formation near the contact with the West Kiernan metagabbro sill (Bayley, 1959). 2. Sholdeis exploration, SE ¼ NE ¼ section 21, T45N, R31W, north of the Kiernan quadrangle:

Massive garnet-grunerite schist in the Fence River Formation (Gair and Wier, 1956). 3. Florence area, Wisconsin-Michigan: Magnetite-grunerite schist in the Badwater Greenstone and in the Riverton Iron Formation (Dutton, 1964).

**Marquette County:** 1. In the Bijiki and Negaunee Iron Formations in the Marquette iron range generally: Former siderite-chert rocks now metamorphosed to grunerite-quartz + magnetite rocks (Lamey, 1934; Mann, 1953; James, 1955). Specific localities follow. 2. Humboldt area, section 11, T47N, R27W: Grunerite-quartz rock (Van Hise and Bayley, 1897; James, 1955). Richarz (1927a,b,c) describes a pale gray grunerite from Mount Humboldt, 0.8 km south of the railroad station, from a grunerite-magnetite rock with a trace of calcite. Also magnetite-grunerite-garnet or hornblende rocks. 3. West of Humboldt in section 18, T47N, R28W: Grunerite-quartz rock (James, 1955). 4. *Michigamme mine*: In Bijiki Schist with quartz, almandine, magnetite, biotite, chlorite, and a blue-green amphibole. 5. *Imperial mine*: Similar occurrence (4-5, Richarz, 1927a,b,c). 6. Near Michigamme: Fine-grained, felted, yellowish-gray manganoan grunerite with garnet, chlorite, and magnetite in the Bijiki Schist (Sundius, 1931). Also noted by Van Hise and Bayley (1897) in section 19, T48N, R30W. 7. *Champion mine*: Found in a schist partly altered to talc with magnetite, garnet, biotite, talc, and blue-green hornblende (Lane et al., 1891). See Babcock (1966a, b). 8. *Beacon mine*: Radial clusters of gray needles. 9. Bridge over highway M-95 0.4 km south of Republic: Found with almandine. 10. Greenwood mine, Greenwood: With hematite and magnetite (Morris, 1983). 11. Section 2, T48N, R27W, just north of the old Holyoke mine: Grunerite-magnetite schist (Van Hise and Bayley, 1897). 12. Republic mine: As magnetite-grunerite schist and finely laminated sideritic magnetite-grunerite schist in section 13, T47N, R27W. As cummingtonite - grunerite schist resulting from metamorphism and hydrothermal alteration of diabase (Yin and Grant, 1992). In Negaunee Iron Formation in the assemblage fayalite, hedenbergite, grunerite, hornblende, biotite, calcite, quartz, and magnetite (Haase and Klein, 1978). Also noted by Van Hise and Bayley (1897). 13. Northwest of Palmer: Locally abundant as porphyroblasts and veinlets resulting from contact metamorphism of the Negaunee Formation. 14. Near Republic in

basal conglomerate of the Ajibik Quartzite with garnet, chlorite, and magnetite, in clusters of radiating blades (Van Hise and Bayley, 1897). **15.** Center section 12, T47N, R29W: Grunerite-magnetite schist (Van Hise and Bayley, 1897, Figure 85). **16.** Southeast of Ishpeming, section 12, T47N, R27W. **17.** Magnetic mine, northwest end of Republic trough, section 20, T46N, R30W. **18.** Ishpeming, east of Lake Bancroft: Grunerite-magnetite schist with sideritic slate adjacent to greenstone (15-18, Van Hise and Bayley, 1897). Also widespread in a broad area south of Negaunee and east of Ishpeming. **19.** A knob of greenstone in the NE  $\frac{1}{4}$  section 20, T47N, R27W, (Foster Lowthian area) exposes grunerite-magnetite slates and schists. Also in adjacent sections 24 and 29, T47N, R28W. **20.** East mine, near Champion: Fine-grained in schist.

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