FORSTERITE

Mg_2SiO_4

(see also fayalite)

Figure 80: Forsterite (variety peridot) from the Site 73 kimberlite near Hermansville, Menominee County. Individual grains average 4 mm. Shawn M. Carlson collection, Jeffrey Scovil photograph.

A common member of the olivine group, found in ultramafic and mafic igneous rocks (peridotites, kimberlites, gabbros, basalts) and in some skarns and marbles. Forms a solid solution series with fayalite. "Chrysolite" is an old name for intermediate members of the series. Olivine also is one of the usual and common constituents of stony meteorites, occurring in shotlike bodies called chondrules. Northern and Southern Peninsulas.

Allegan County: The Allegan meteorite found on Thomas Hill in Allegan contains chondrules of olivine with enstatite.

Houghton and Keweenaw Counties: Found in basaltic flows and dikes of the Keweenaw Series. It is usually altered to serpentine or mixtures of goethite and chlorite or biotite (e.g., "iddingsite," or "rubellan") (Lane, 1911). It is often concentrated near the base of the flows and near or above their central portions (Broderick, 1935; Cornwall, 1951). Most olivine has been at least partly altered; much has been completely altered, even in flow interiors. Relict olivine from the Greenstone flow ranges in composition from 55 to 97 mole% forsterite (Markart, 1975).

Iron County: The Lake Ellen kimberlite, SW ¼ section 27, T44N, R31W (kimberlite) contains largely serpentinized olivine. A few fresh olivines in the kimberlite matrix have a small variation in forsterite component, $Fo_{90.5\text{-}91.0}$. The average content of NiO = 0.38% suggests they are xenocrystic rather than phenocrystic (McGee and Hearn, 1983). Olivine also occurs in the spinel pyroxenite-peridotite xenoliths also mainly serpentinized.

Marquette County: 1. Pulpit rock, Presque Isle. **2.** The Yellow Dog peridotite body in the Yellow Dog plains in northern Marquette County is represented surficially by only two outcrops, in sections 11 and 12, T50N, R29W (Klasner et al., 1979). It consists of partly serpentinized plagioclase lherzolite containing 40 to 50% olivine ($Fo_{80\text{-}81}$), much of which is altered to serpentine. (Klasner et al., 1979).

Menominee County: Site 73 kimberlite north of Hermansville: Occurs as pale yellow anhedral crystals up to 1 cm with intricate surficial resorption patterns. Some of these olivines are gem grade and suitable for faceting. Others contain inclusions of phlogopite or emerald green chromian diopside or chromian augite. Unaltered olivine occurs in most of the kimberlites in northern Michigan and usually ranges between Fo_{89} and Fo_{98}. (S. M. Carlson, personal communication, 1995).

Ogemaw County: The Rose City meteorite found about 15 km northeast of Rose City contains olivine and enstatite.

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