

X-RAY AND OPTICAL CHARACTERIZATION OF THE FORSTERITE-FAYALITE-TEPHROITE SERIES WITH COMMENTS ON KNEBELITE FROM BLUEBELL MINE, BRITISH COLUMBIA: DISCUSSION

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Within the olivine group A_2SiO_4 , Fleischer (1975) indicates four species: tephroite (Mn), fayalite (Fe), forsterite (Mg), and liebenbergite (Ni). The ionic radii in octahedral coordination with high-spin state where applicable are, as given by Whittaker & Muntis (1970), 0.91 Å for Mn^{2+} , 0.86 Å for Fe^{2+} , 0.80 Å for Mg^{2+} , and 0.77 Å for Ni^{2+} . The preferential occupancy of the two cation sites $M(1)$ and $M(2)$ is attributed by Walsh *et al.* (1976) to simple crystal-field theory. Normally, olivine is formed in igneous rocks at high temperature. Therefore, as quoted by Mossman & Pawson (1976), atomic substitution closely approaches the ideal.

Crystallographically, the olivine group should be subdivided into end-member components. Therefore, Figure 1 should replace the central

part of Figure 1 by Mossman & Pawson (1976). Thus ferrohortonolite (=fayalite), hortonolite (=magnesian fayalite), hyalosiderite (=ferroan forsterite), chrysolite (=forsterite), iron knebelite (=fayalite), knebelite (=magnesian fayalite or ferroan tephroite), mangan-knebelite (=tephroite), picrotephroite (=tephroite or forsterite), and picroknebelite (=fayalite or forsterite or tephroite with adjectival modifiers if desirable) should be discarded. In addition, the four chemical analyses given in Table 2 by Mossman & Pawson (1976) describe manganian fayalite, which is the mineral name used by Grice & Gault (1977).

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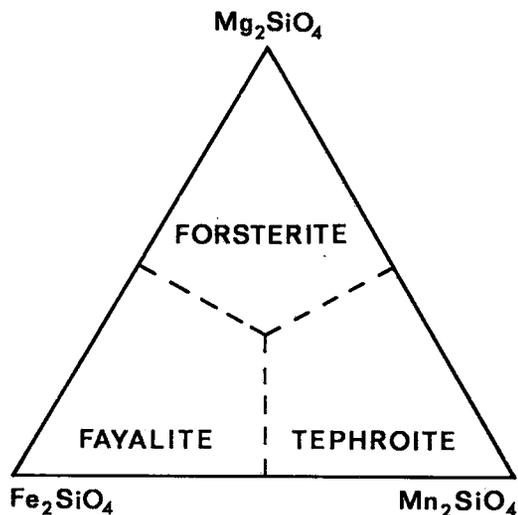


FIG. 1. Nomenclature within the olivine group.