

THE OCCURRENCE OF OLIVINE HYPERITE AT ØDEGÅRDENS VERK, BAMBLE, SOUTH NORWAY

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A study of the first find of olivine relics in hyperite at Ødegårdens Verk and the surrounding coronas leads to the conclusion that the second rim of garnet is of metamorphic origin while a third rim of scapolite is apparently related to a later magmatic phase.

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In the introduction of the section on Ødegården in his classic hyperite monograph, Brøgger (1934) wrote: 'None of the different occurrences of hyperites from Ødegården, of which I have had specimens preserved, is olivine bearing, although this mineral had been originally part of their composition.'

During detailed studies of the hyperites and the scapolitization of the Ødegården area which are being made by members of the Frankfurt Institute, the author has found a locality in the Ødegårdens Verk hyperite (700 meters southwest of the abandoned buildings of the former apatite mine) where olivine is also present (Figs. 1 and 2). Observations under the microscope already permit conclusions regarding the relative position of the scapolitization to be drawn.

The olivine grains have a diameter of 1–6 mm and a mean composition of Fo 65 ± 2, in good agreement with the compositions reported for olivines from other South Norwegian hyperites by Brøgger (1934) and Reynolds & Frederickson (1962). The primary mineral succession as derived from a study of a large number of thin and polished sections is: plagioclase — olivine — titanomagnetite + augite, in contrast to Brøgger (1934), but in agreement with Frodesen (1968).

All olivines observed at Ødegårdens Verk are surrounded by a corona of orthopyroxene (hypersthene, bronzite, and enstatite) of constant thickness (except for those olivine grains bordering augite). Also titanomagnetite is surrounded by a corona, this one consisting of biotite (and some hornblende).

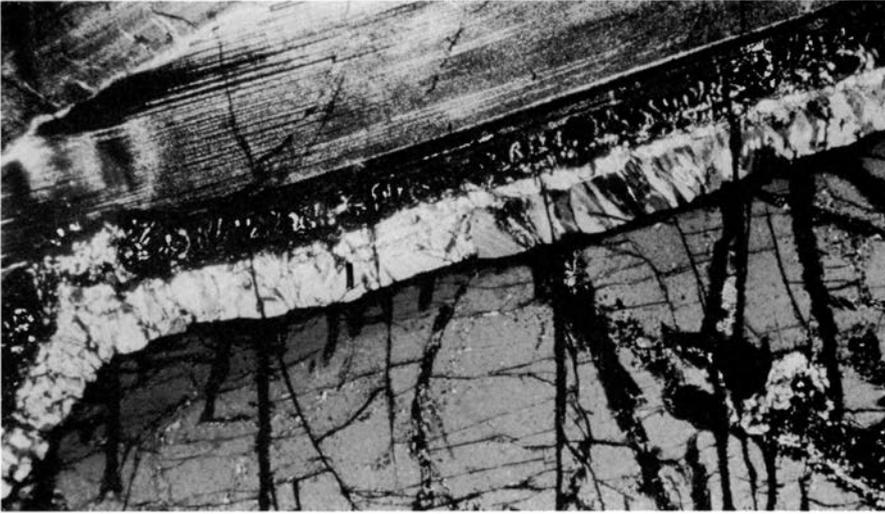


Fig. 1. Coronas bordering olivine (below). Inner rim is orthopyroxene, ordered radially around olivine, the orthopyroxene showing exsolution lamellae of diopside — hedenbergite. Outer rim (black) is garnet, adjacent to plagioclase (top). Ødegårdens Verk hyperite body. Crossed nicols, $\times 50$.

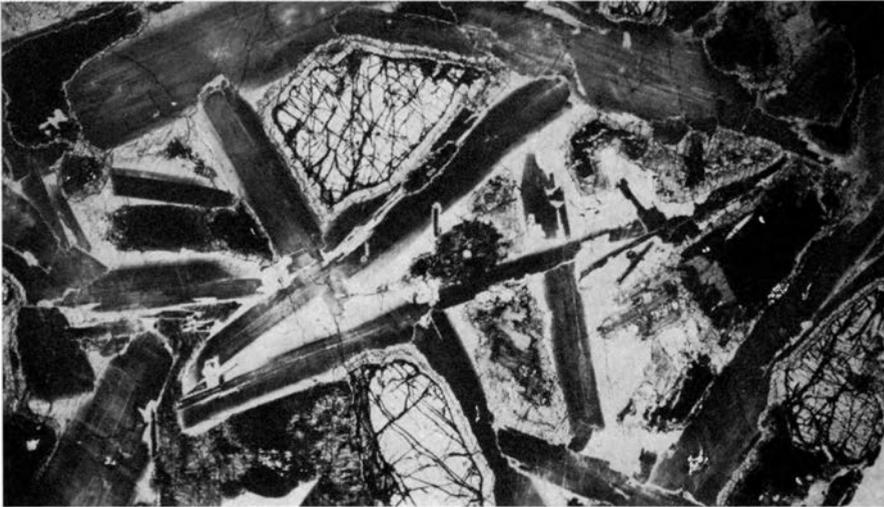


Fig. 2. Olivine with pyroxene/garnet coronas, the former incompletely developed, the latter missing where olivine is adjacent to augite. Ødegårdens Verk hyperite body. Plane light, $\times 5$.

Both olivine and titanomagnetite exhibit a thinner second corona at the contact with plagioclase, this one composed of garnet (Fig. 1).

Finally, hyperite relics within ödegårdite (in which the olivines are completely transformed to orthopyroxene + magnetite) also show the two

coronas around the former olivines, which are here surrounded by a third discontinuous rim of scapolite.

The present author concludes from his study of these coronas that the second corona is of metamorphic origin while the third one apparently belongs to a magmatic phase during which, at Ödegården, chlorine and other characteristic elements were introduced to produce scapolite, etc. (an explanation was given by Bodart 1968). Regional metamorphism must therefore have taken place already during the magmatic events of which the scapolitization is one of the later stages, if the intrusion of the hyperites and the scapolitization are not considered to belong to two completely different events in the history of the area.

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