

Note on gel structures in a pyrite bed, the Grong district.

Av

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With two text-figures.

The pyrite ores of the Caledonides in Norway have been classified by Carstens (1919) into a number of groups. Later Carstens (1922) described the so-called "Leksdal group" in great detail, and he showed that the pyrite beds of the Leksdal type exhibit a number of geologic features which clearly mark them as sediments. The ore material was assumed to be derived from volcanic exhalations, because the ore beds are usually located in greenstone or greenschists. These conclusions have not been doubted in the later Scandinavian literature on ore genesis.

Many occurrences of such sedimentary ores ("vasskis") are known in the Grong district (Oftedahl, 1958). Since these pyrite beds constitute the most frequent deposits, such pyrite ore is also most often found during the search for glacially transported ore boulders in the district. A specimen was during the summer of 1957 brought in from such an ore boulder for the specific reason that the ore seems to contain minute tubes of black shale or of pyrite. The boulder is located in the southern slopes of Møkkelvikfjellet, west of lake Tunnsjø and is no doubt derived from one of the several thin pyrite beds of that area.

Polished sections and a thin section show that the "tubes" are spherical with concentric shells of pyrite and quartz. The diameter is mostly between one and two millimeters. X-ray powder exposures have ascertained that the pyrite is not mixed with any marcasite.

Fig. 1 shows a cluster of three spheres. The section contains other spheres, but no other clusters. Fig. 2 shows another sphere with a large number of alternating shells. Under crossed nicols a phenomenon not shown in fig. 2 appears. The quartz both in the shells and outside the sphere consists of lamellar individuals. Such a structure

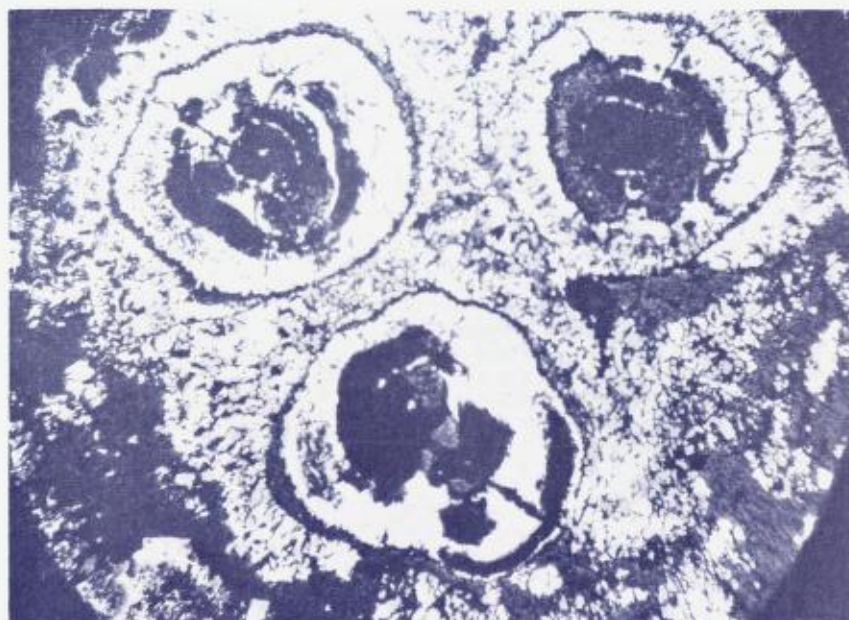


Fig. 1. Polished section of gel structures in ore boulder B 104 — 1957, located 1.5 km south of 938 m top, Møkkelvikfjellet, the Grong district. White-pyrite, gray-quartz, black-shaly material and holes (centers). 30 ×.

Polerslip av gelstrukturer i kisblokk B 104—1957, 1,5 km syd for 938 m topp, Møkkelvikfjellet, Grongfeltet. Hvitt-pyritt, grått-kvarts, sort-skifer og hull i preparatet (sentrum). 30 ×.

is also seen in various other parts of the section and there is a continuous transition to irregular quartz grains. The lamellar aggregates are unoriented, therefore the lamellae can not have a tectonic origin, and they must be interpreted as recrystallized agate.

The concentric structure of figs. 1 and 2 are similar to what has been described as gel structures by Schneiderböhn and Ramdohr (1931, p. 166) or "colloform textures" by Edwards (1954). From the Turkish pyrite deposit Ergani-Maden Sirel (1949) has shown structures, especially his fig. 8, very similar to those of figs. 1 and 2.

In the school of ore geology of Schneiderböhn and Ramdohr gel structures are considered to indicate a syngenetic origin. This means that the precipitation of the gel is supposed to have taken place in surface waters, usually the sea. But in his text book Edwards (1954, p. 29) has not mentioned this possibility in his discussion of "collo-

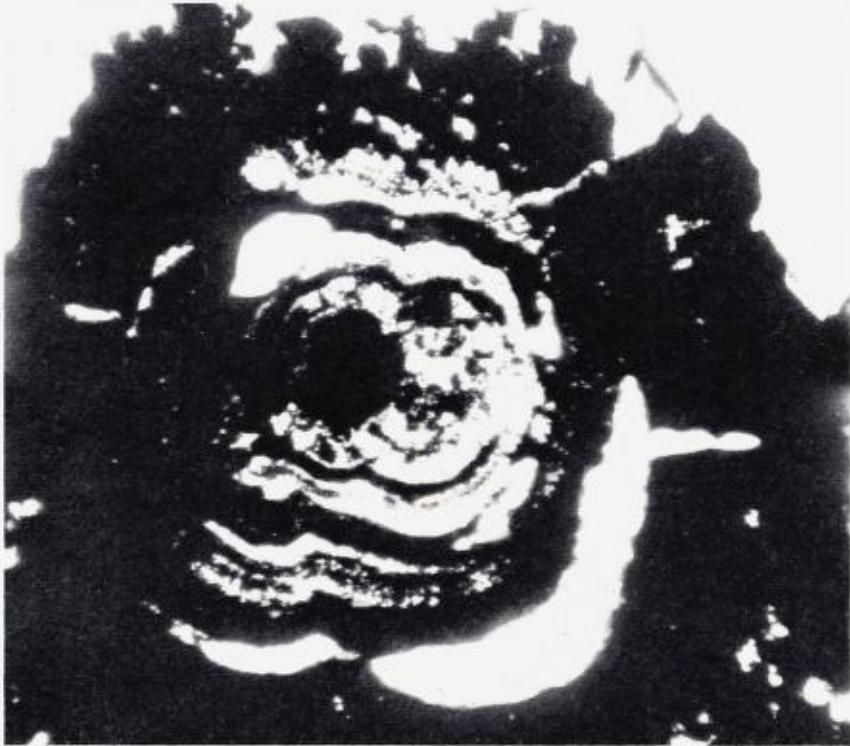


Fig. 2. Thin section from same hand specimen as fig. 1. White-quartz, black-pyrite, shale, and holes. 100 ×.

Tynnslip fra samme håndstykke som fig. 1. Hvitt-kvarts, sort-pyritt, skifer og hull. 100 ×.

form textures" but only explains how they may be formed in supergene minerals, deposited from gels.

In accordance with Schneiderhöhn and Ramdohl (1931) and others the structure in the pyrite from the Grong districts are considered to represent gel structures, formed in the sea water. This supports the hypotheses of C. W. Carstens (1919, 1922) for the Leksdal type of pyrite ore as an exhalative sedimentary ore. The finding of this gel structure is reported in this note because it is the first time that such structure had been observed in generally recognized exhalative-sedimentary pyrite ores of the Scandinavian Caledonides.

Pyritic spheres have earlier been found in Norway. Carstens (1928, p. 12) describes such spheres of 1—2 cm diameter found in

the dumps from Storvarts mine, northeast of Røros. Besides pyrite the spheres contain a little sphalerite, quartz, calcite, biotite and chlorite. The arrangement of the minerals in the spheres is mostly concentric, but to some extent radial. These spheres occur in pyrite-free copper ore, consisting of pyrrhotite, calcopyrite, sphalerite and quartz. It seems possible that the spheres are formed by gel precipitation.

Sammendrag.

Gelstruktur i vasskis, Grongfeltet.

I en kisblokk som ble funnet ved NGU's blokkleting vest for Tunnsjøen i Grongfeltet forekommer det gelstrukturer, se fig. 1 og 2. Slike strukturer anses i alminnelighet å tyde på syngenetisk dannelsesmåte, og de bekrefter C. W. Carstens' antagelse av en ekshalativ-sedimentær dannelse for den typiske vasskis. Strukturene ligner meget på de som er avbildet av Sirel (1949), særlig fig. 8. Analoge strukturer er omtalt av Carstens (1928, s. 12) fra Røros.

References.

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