



Blast-drilling in a large quartz vein on the Nasa mountain, 1000 m.a.s.l. at the Arctic Circle. Photo: Elkem ASA

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## QUARTZ RESOURCES IN NORWAY A VARIED SPECTRUM

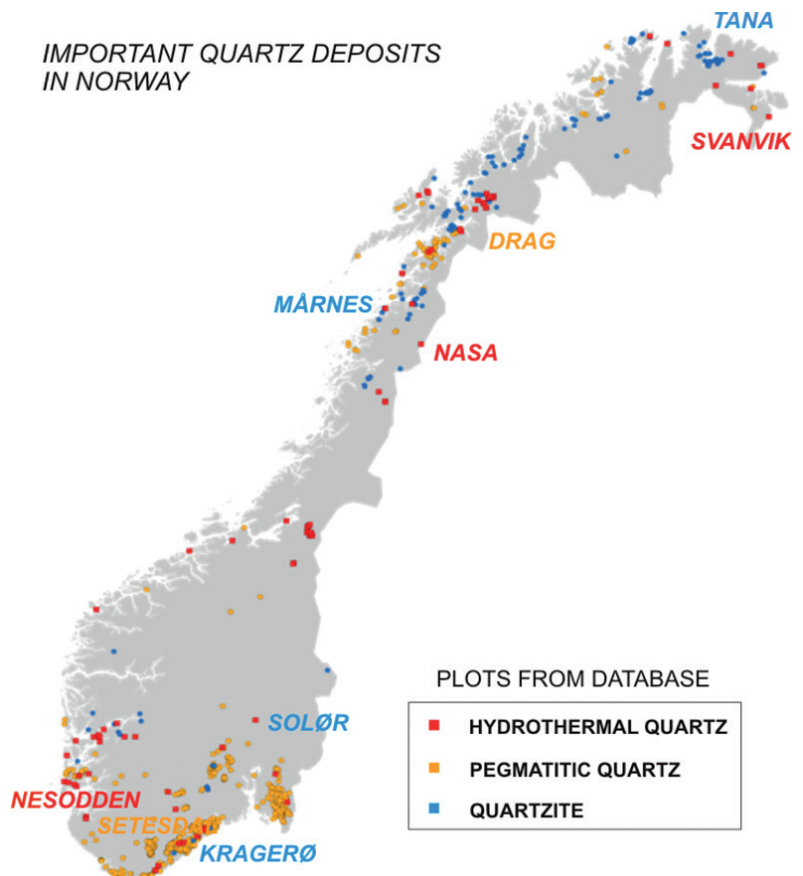
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Norway has a rich variety of quartz resources and is the main producer of quartzite and high purity quartz in Europe. Industrial quality quartz occurs in both pegmatites, hydrothermal veins and quartzites. The Geological Survey of Norway (NGU) has been active in locating and investigating most of the known deposits; in recent years dedicated surveys and sampling of various quartz resource types have been undertaken throughout the country.

### QUARTZ IN PEGMATITES

Pegmatites often contain very pure quartz and in Norway quartz has been produced periodically in two main provinces: The Drag area close to Narvik in Northern Norway and in Setesdal and surrounding areas in Southernmost Norway. Currently only very minor production takes place in South Norway, but in Drag the company The Quartz Corp extracts and processes both local and imported high purity quartz. The Quartz Corp also exploits a hydrothermal vein in Svanvik close to the Russian border. Recently NGU-surveys have located pegmatites on the South-west coast of Norway with interesting qualities of high purity quartz.

IMPORTANT QUARTZ DEPOSITS IN NORWAY



## HYDROTHERMAL QUARTZ VEINS

Large hydrothermal quartz veins are present both north and south in the country and some have been in production for silicon metal, silicon carbide and ferrosilicon. At present two large high grade veins are being closely examined for possible future mining: The very large Nasafjell veins by the Arctic Circle (front photo) where Elkem ASA currently awaits governmental approval, and the Nesodden deposit by the Hardangerfjord in Southern Norway, where Nordic Mining ASA is developing a large quartz vein for industrial operation.



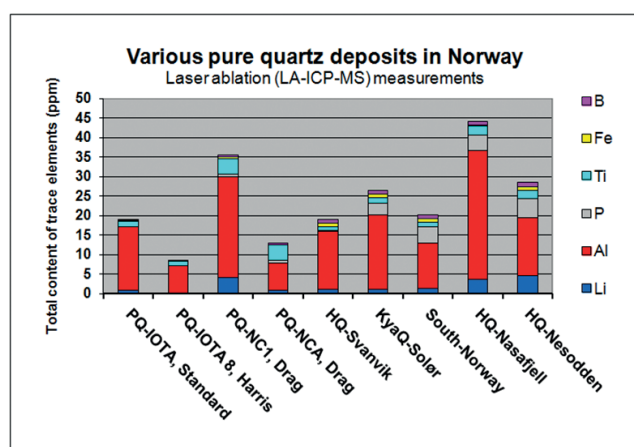
## QUARTZITES AND QUARTZITIC SANDSTONES

Lump quartz from quartzites and quartzitic sandstones has been the main quartz resource in Norway and is the basis for the prominent Norwegian ferrosilicon and ferromanganese industry. Quarrying has taken place in various locations and today operations are ongoing in the world's largest quartzite quarry in Tana on the North Norwegian coast, at Mårnes south of Bodø, and by Kragerø in the south of Norway. The large Elkem-owned ferrosilicon quality quartzitic sandstone deposit in Tana is a main resource for several ferrosilicon plants in Norway and Island. Elkem is also producing a very high grade refined silicon metal suitable for electronic industry from the Tana deposit through the application of an advanced refinement process at a plant in Western Norway.

Elkem Tana quartzite quarry in Finnmark

## KYANITE QUARTZITES, A NEW DEPOSIT TYPE

Recent discoveries include several deposits of very high purity quartz in kyanite rich quartzites. Large tonnages are available, especially near Solør in Southern Norway. So far the grain size is too small for existing liberation techniques, but this type of deposit may be a target for future interest as progress in technology develops.



## COARSE-GRAINED GRANITES, TONALITES AND TRODHJEMITES

Recently NGU has also undertaken sampling of coarse-grained quartz-bearing intrusive rocks with an aim to test the possibility for finding high-purity quartz in such rocks.

## CHEMICAL ANALYSIS WITH LASER ABLATION

High purity quartz has normally very strict quality criteria allowing only very minute quantities of contamination from other elements than Si. Such quartz is therefore difficult to quality test. A dedicated method with laser-ablation ICP-MS has therefore been sophisticated at NGU, and very high quality analyses of individual quartz-grains made possible.

## MORE INFORMATION?



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