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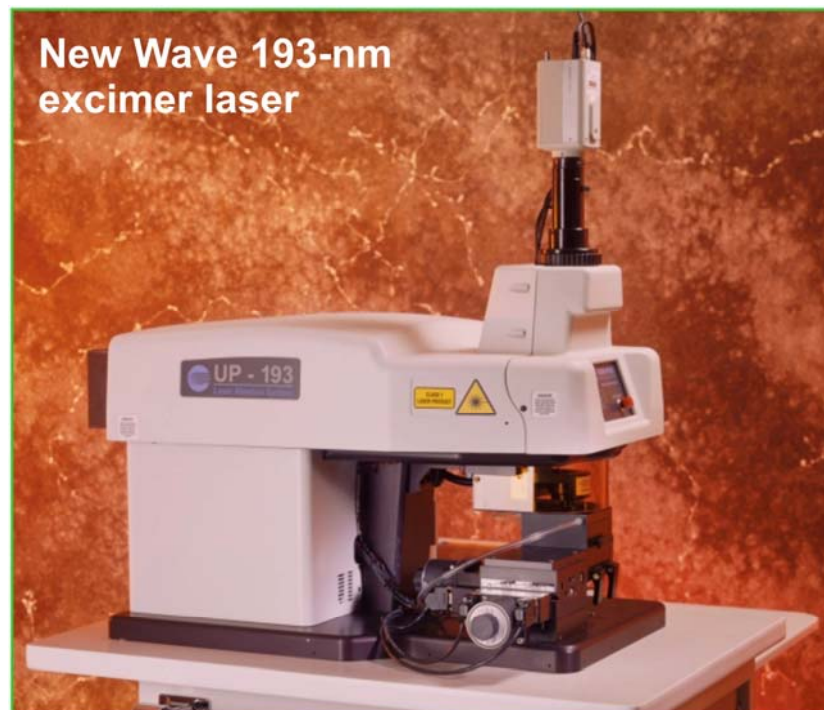


ICAM 2011 Pre-Congress Workshop

Laser Ablation ICP Mass Spectrometry (LA-ICP- MS) in mineralogy

When	9.00-15.00, 30 July 2011 (before ICAM)
Venue	www.ngu.no (Geological Survey of Norway)
Who	Belinda Flem, Øyvind Skår, Axel Müller (Geological Survey of Norway)
Max Participants	12
Fee	2000 NOK
Registration	Through ICAM2011 Congress website (see www.icam2011.org)

Background: One of major tasks of the Geological Survey of Norway (NGU) is the registration and chemical characterization of national mineral resources. In addition NGU is involved in a number of national and international research project related to mineral characterization. For that reasons NGU is equipped with a wide range of sophisticated analytical instruments including a high resolution (HR) laser ablation inductively couple plasma mass spectrometer (LA-ICP-MS) type ELEMENT-1, Finnigan MAT. The instrument is routinely utilized for the determination of trace element in economic valuable minerals such as quartz, apatite, zircon, garnet, calcite, ilmenite, rutile, etc. In addition, concentrations of heavy isotopes such as U and Pb isotopes are determined for dating of zircons.





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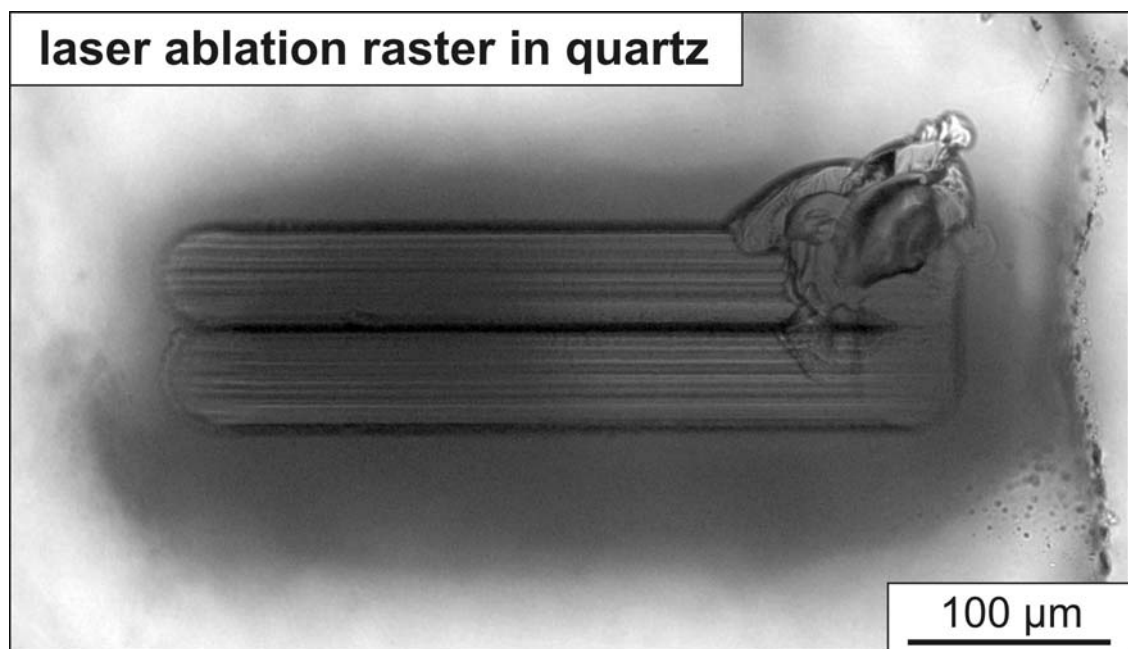
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Description of Workshop: The workshop comprises four parts (1) fundamentals of the LA-ICP-MS, instrument tuning and standard selection, (2) trace element determination of industrial and rock-forming minerals and data processing, (3) U and Pb isotope analyses zircons and calculation of geological ages utilizing the results, and (4) practical work at the instrument.

The first presentation about the fundamentals of the LA-ICP-MS will be held by Belinda Flem who is responsible for method development at the LA-ICP-MS laboratory. Belinda has a strong geochemical background and a long-time experience with laser ablation. The presentation will focus on the fundamentals of HR-ICP-MS and lasers, possibilities and limitations. The analysis of quartz will be used as an example.

The second presentation will be given by Axel Müller who is a petrologist working predominantly with mineral deposits related to igneous rocks. The last decade Axel has focused on the exploration and chemical characterization of high-purity quartz deposits. For that reason Axel's presentation will deal with the ultra-trace element determination of natural quartz. After a short introduction about how quartz deposits occur, how they are explored and sampled Axel will describe the procedure of sample preparation, sample analysis and data processing. In addition, examples of apatite and garnet analyses will be illustrated.





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After lunch the group will be split into two groups of 6 people each. The first group will listen to the presentation held by Øyvind Skår about zircon dating while the second group will carry out practical work at the instrument. After 1 ¼ hours the groups will change.

Øyvind Skår is a geologist with long experience of dating zircons with the laser ablation ICP-MS technique. This method is the fastest and most inexpensive method of dating large numbers of magmatic rocks older than 400 Ma. At the Geological Survey of Norway the method has become an important tool in regional bedrock mapping during the 10 years we have used the method. The short course will include a theoretical introduction to the U-Pb geochronology, examples of how the method is used, sample preparation, use of standards, description of the analytical procedure, data reduction and interpretation of the data. During the course practical problems will be discussed and how the problems have been solved.

AGENDA (tentative)

- 0830: START FROM THE RADISSON BLUE HOTEL (price of the taxi to NGU is included in the workshop fee)
- 0900: INTRODUCTION by Axel Müller
- 0910: FUNDAMENTALS OF LA-ICP-MS by Belinda Flem
- 1030: COFFEE BREAK
- 1050: LA-ICP-MS APPLIED TO INDUSTRIAL AND ROCK-FORMING MINERALS by Axel Müller
- 1130-1230: LUNCH
- 1230: 1. group: ZIRCON DATING UTILIZING LA-ICP-MS by Øyvind Skår and
2. group: PRACTICAL WORK AT THE LA-ICP-MS by Belinda Flem and Axel Müller
- 1345: CHANGE OF THE GROUPS
- 1500: END OF THE WORKSHOP

PRINTOUTS of the presentations with space for notes are to be handled out at the beginning of the workshop