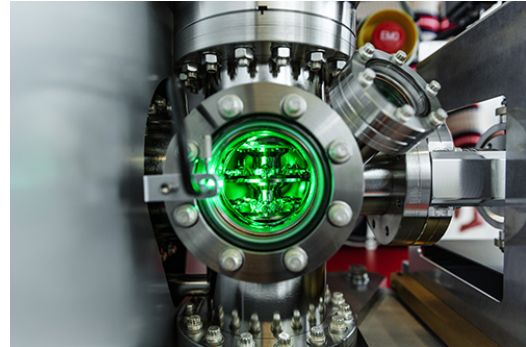


Joined up thinking to make materials greener

A new research centre is about to give Norway a window into how its rich mineral resources can be turned into useful – and more environmentally-friendly – materials.

The Norwegian national centre for minerals and materials characterisation, known as MiMaC for short, promises to look at every step of the process of turning minerals into materials. The centre is a joint project of NTNU, the Geological Survey of Norway and research company SINTEF.



The Atom Probe at MiMaC, photo: Geir Mogen/NTNU Nano

When it's fully up and running by the end of the year, it will be made up of five world-class instruments allowing researchers to look at materials in different ways, from the atomic scale up to the microscale.

But the crown jewel of the project is already in place: a state-of-the-art atom probe that can image materials in three dimensions. It works by using laser or high voltage pulses to evaporate away the tiny sample you put into the probe, pushing its way through a few atoms at a time.

“You can reconstruct exactly where every single atom is sitting,” says Jostein Mårdalen, head of the Department of Materials Science and Engineering at NTNU. “We have a tool which is much more accurate - with higher resolution and better performance - than any other material science instrument available.”

As a national centre, MiMaC is open to scientists from other institutions who want to use its instruments. Mårdalen says he hopes that other researchers will take advantage of the atom probe to see objects such as fossils and even meteorites in a new light.

But the main reasoning behind MiMaC is more down to Earth. Using the centre's instruments, researchers will look at the whole lifecycle of minerals: from their extraction and processing, to their design and production, and eventually their re-use or recycling.

Until now, neither research nor industry has had such a complete view, leading to inefficient ways of making materials. For example, a raw material might be stripped of impurities, only to have some new elements later added back in to make an alloy.

Now demand for greener materials is growing, Mårdalen hopes MiMaC will help both research and industry change. Seeing the full picture, he says, should allow researchers to come up with ways to make manufacturing processes less wasteful and better for the planet – for example, by finding new ways to use recycled materials. “The industry now is thinking how to be greener,” he says.

Read more about the MiMaC’s instrument’s here:

<https://www.ntnu.edu/nano/infrastructure>

Kelly Oaks, March 2019