

Ancient data discovered with new U of A technology

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The Cameca IMS-1280 ion probe is the centrepiece of the U of A's new Canadian Centre for Isotopic Microanalysis.

The University of Alberta has new multi-million dollar technology that can analyze an ancient mineral sample and tell you how it was created, its chemical makeup and its potential commercial value. It can also analyze teeth from an animal and tell you about the environmental conditions it experienced.

The machine is an ion probe and this model, the Cameca IMS-1280, is the only one of its kind in Canada. It is also the centrepiece of the U of A's new Canadian Centre for Isotopic Microanalysis, which was officially opened Sept. 7.

The probe allows for the closest look possible into the atomic make up of material such as a rock sample or bone.

“The probe can capture a moment in time, possibly millions or billions

of years ago when the [molecular structure](#) of a mineral was being formed,” said Thomas Stachel, researcher and director of the centre.

The probe’s powerful resolution gets down to a level of 10 microns, about one-tenth the width of a human hair.

The natural-resources industry will use the centre’s equipment, including the ion probe, to capture new information about mineral and fossil-fuel formations, which will aid in extraction and development. Stachel says geologists looking for diamonds in Canada’s North are concerned with the carbon [isotopic composition](#) of mineral samples and the new ion probe can pick out the exact [carbon atoms](#) they’re looking for.

“Our machine determines what geological forces created the carbon and the period of time it took to form,” said Stachel. “Knowing how and when a diamond was formed tells you a lot about its value.”

Stachel explains that resource companies will use data from the centre to improve their chances of finding the most valuable diamond deposits. “Mineral revenue from the north is 98 or 99 per cent diamonds,” said Stachel. “Keeping the costs and efficiency of exploration down is essential for keeping that Canadian industry alive.”

In addition to natural-resource clients, the centre will carry out work in a variety of university disciplines.

Stachel says biologists can use the probe to learn a lot from an animal’s tooth. Instead of grinding up a polar bear’s tooth and analyzing its molecular content in bulk, a tiny slice of the tooth is put into the new probe. Stachel likens the process to analyzing the rings of a tree. “We can look at every single year in the life of that polar bear and analyze what it ate, where it lived and extrapolate the environmental conditions it experienced.”

The centre is funded with approximately \$14.8 million from the Canada Foundation for Innovation, the Alberta government—through the Alberta Science and Research Partnership Initiative—and the University of Alberta, through the Faculty of Science and the Department of Earth and Atmospheric Sciences.

“The expertise and equipment required to conduct this kind of research now and into the future is highly specialized and expensive,” says U of A President Indira Samarasekera. “The Canadian Centre for Isotopic Microanalysis will get to the answers and solutions we all need faster and more efficiently.”

Provided by University of Alberta

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