



Media release

18 February 2009

New invention set to unlock environmental secrets

Major elements in the air, water, earth – and even the particles in outer space - are about to become much easier to analyse thanks to a new Australian invention.

The instrument, known as IRMS++, was invented by Dr Mike Hotchkis and Dr Chris Waring at ANSTO, the Australian Nuclear Science and Technology Organisation.

IRMS++ uses a newly developed, patented microwave-driven plasma source to generate large signals directly from very small volumes of liquid or gas for measurement of their isotopic composition.

An agreement has now been signed with Australian Scientific Instruments (ASI) to market IRMS++ worldwide. Australian Scientific Instruments (ASI) is a subsidiary of ANU Enterprises (ANUE), the commercial arm of the Australian National University (ANU).

As one of its many applications, IRMS++ will be used by climate scientists to analyse ice samples much more rapidly and with greater resolution than at present. Measurements of the ratio between isotopes of oxygen (^{18}O / ^{16}O) allow scientists to estimate global temperatures back over thousands of years, information of vital importance in tracking climate change.

By enabling researchers to analyse liquid water directly, the team of ANSTO and ASI believe IRMS++ will revolutionise the way climate studies are done.

“Currently, scientists must go through laborious multi-step processes to extract ice samples and determine the isotopic ratios” said Dr Hotchkis. “The high efficiency and flexibility of IRMS++ means that tiny samples can be used in a one-step process to get the results they need.”

“Another bonus is the relative ease with which it can measure the rare isotope ^{17}O , simultaneously with ^{16}O and ^{18}O . The combination of all three oxygen isotopes is of great interest to scientists studying the chemistry of the upper atmosphere and the origins of the solar system. There is keen interest in determining the oxygen isotopic composition of the so-called solar wind which emanates from the sun,” he said.

Dr Ed Roberts of Australian Scientific Instruments said IRMS++ has many exciting applications in a range of fields such as environmental, earth, forensic and nutrition sciences.

IRMS stands for Isotope Ratio Mass Spectrometer. The '++' reflects the highly efficient production of highly charged ions in the machine's novel plasma source. The project team will have a prototype available to researchers in 2011, and a commercial version soon after.

ASI develops and manufactures specialist scientific instruments that are sold around the world.

ASI's flagship product, the Sensitive High Resolution Ion Microprobe, or SHRIMP IIe, sets the standard for dating rocks using microscopic samples. Key aspects of SHRIMP IIe technology will be applied to the IRMS++. ANSTO is the home of Australia's nuclear science expertise.

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For more information please contact ANSTO Corporate Communications Manager, Nadia Levin (02) 9717 3199 or 0400 394 085. For more information please contact ANSTO Communications Manager, Nadia Levin (02) 9717 3199 or 0457 505 438.