

Solar Component Survey in Carbonaceous Chondrites

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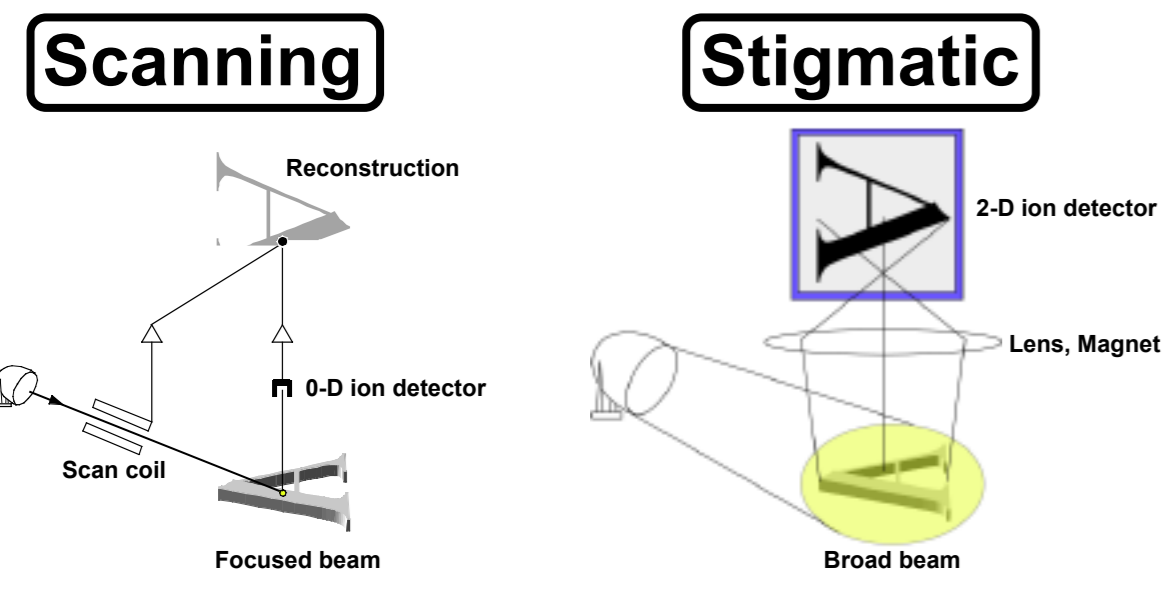
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Oxygen in the solar system is believed to be mixing of ^{17,18}O-rich and ¹⁶O-rich reservoirs (e.g., Yurimoto et al., 2008 and references therein). A candidate of ^{17,18}O-rich end member was proposed from the magnetite in cosmic symplectite ($\delta^{17,18}\text{O} \approx +180\%$) (Sakamoto et al., 2007). However potential candidates of ¹⁶O-rich end member were reported from a chondrule, few CAIs and the Sun, the characteristics of ¹⁶O-rich candidates are unclear (Kobayashi et al., 2003; Gounelle et al., 2009; McKeegan et al., 2011; Krot et al., 2017). We are investigating ¹⁶O-rich components in carbonaceous chondrites using the automated isotope microscope system.

Automated Isotope Microscope System

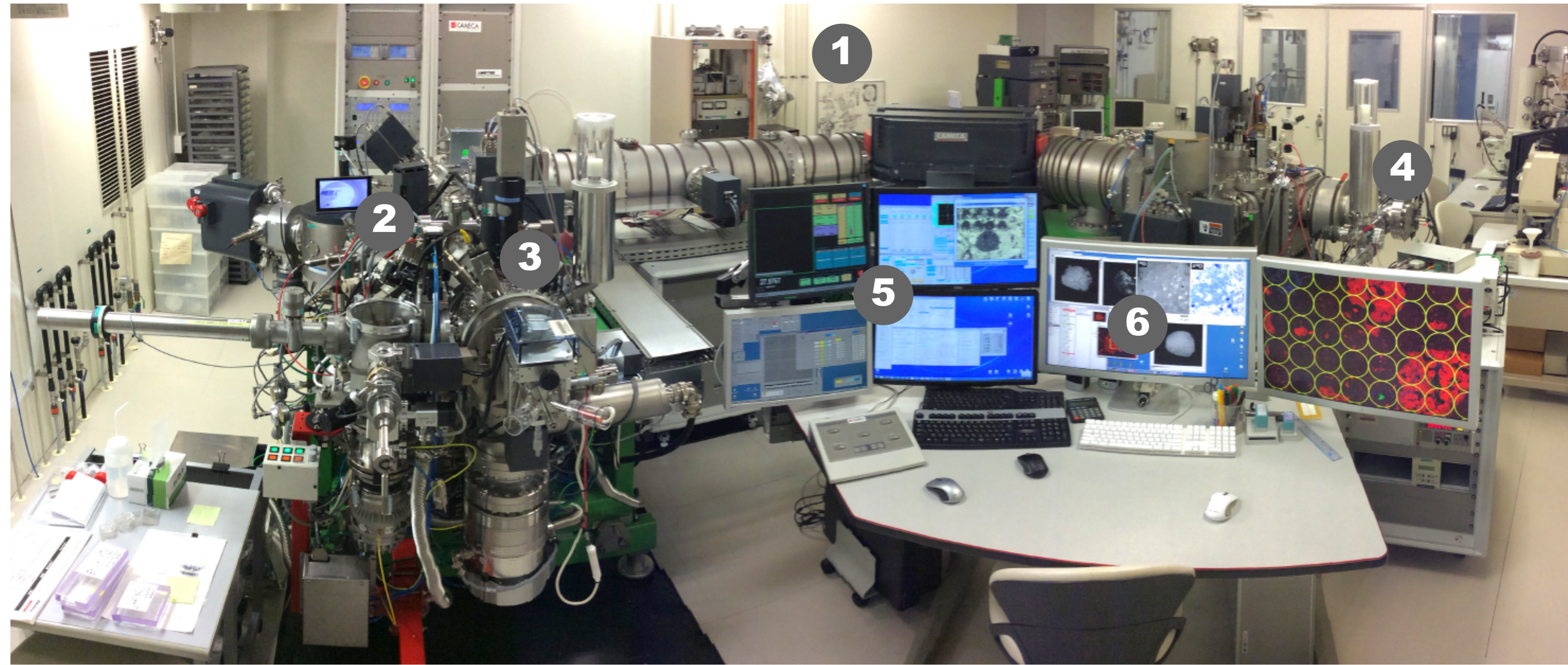
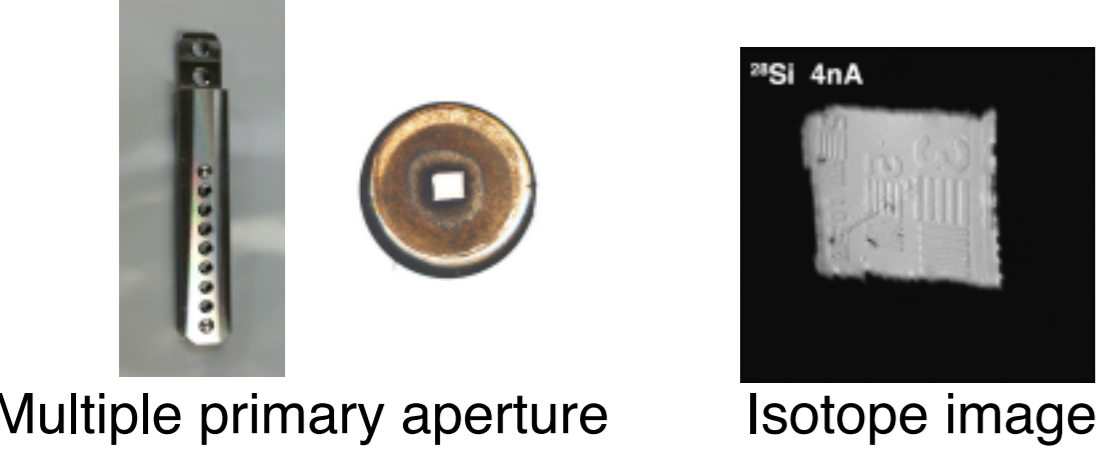
1 Stigmatic optics

High precision imaging for wide area is realized using high intensity probe because the spatial resolution do not depend on the probe size.



2 Shaped probe

Static primary ion beam using aperture illumination mode reduces charging up.

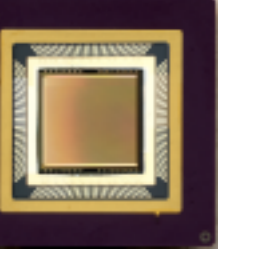


3 Low acc. voltage

Low secondary acceleration voltage allows us to use high primary beam more than 200 nA for insulator without charging up.

4 SCAPS system

The ion imager SCAPS is controlled by PXI system (National Instruments).

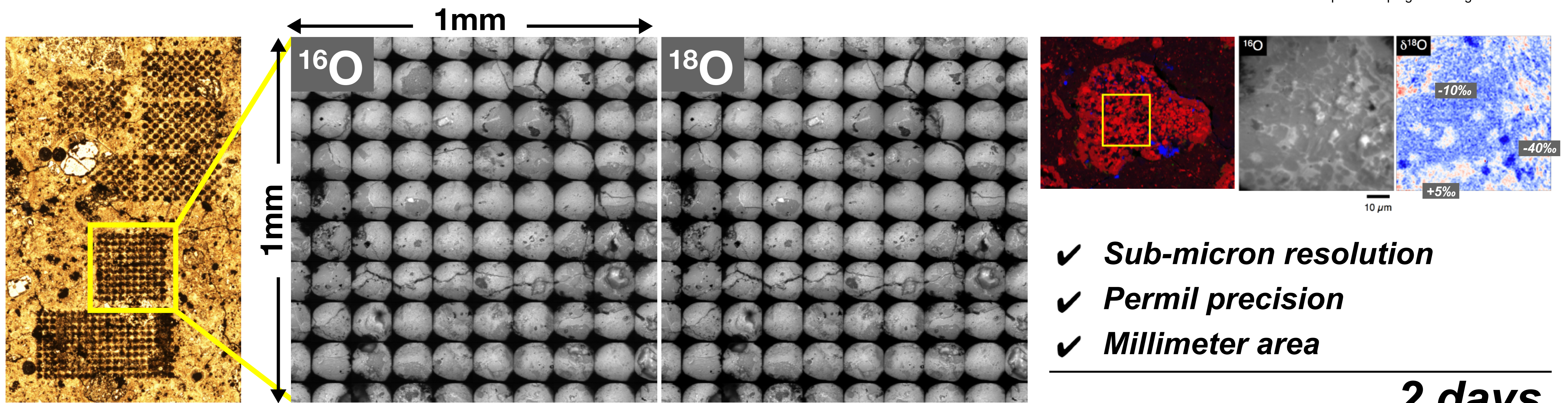


5 Control software

The control software consists of customized CIPS software for SIMS, SUSHI-VIEW for SCAPS and integration software APS-CHAIN. All software is written by LabVIEW.

6 Data processing

Data processing software package "imsVIEW" is developed as a plugin of ImageJ.

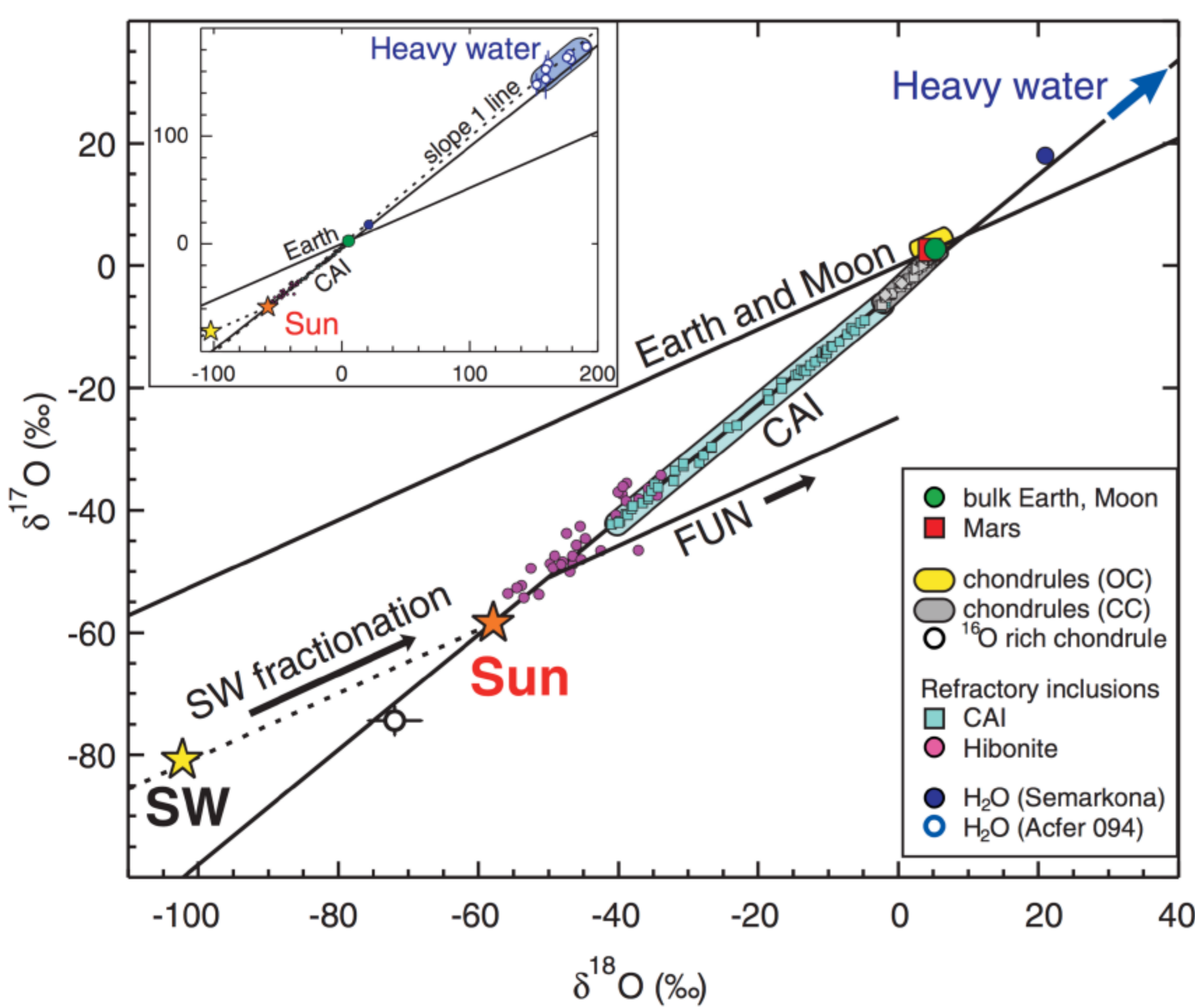


- ✓ Sub-micron resolution
- ✓ Permil precision
- ✓ Millimeter area

2 days

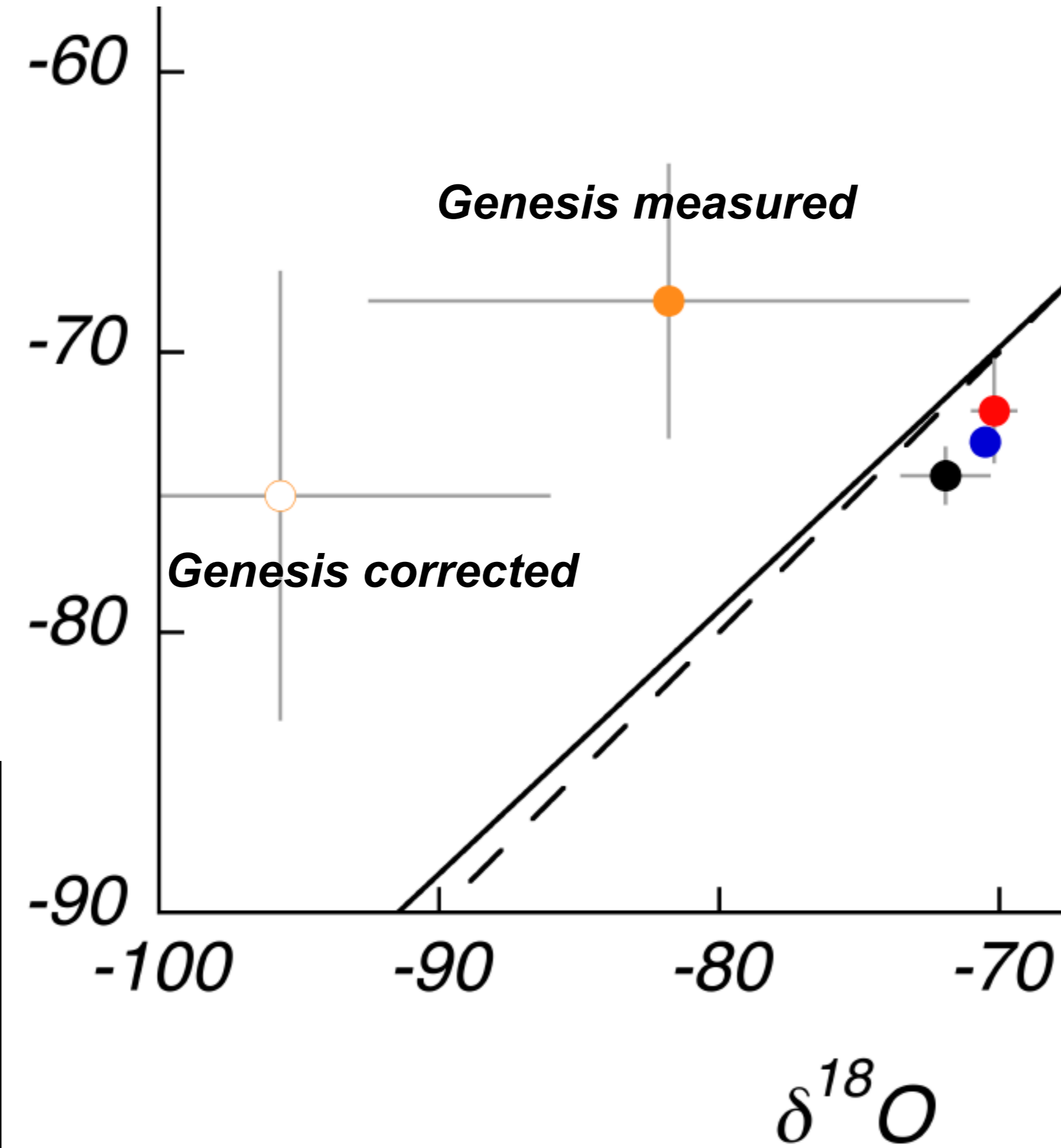
Optical image of Murchison meteorite. Black circles are analyzed regions.

Candidates of Solar Component



McKeegan et al., 2011

Average value of super ¹⁶O-enriched materials



Acfer 214
Kobayashi et al., 2003

