

# 3rd Korea-Japan Joint Meeting on Isotope-Ratio Mass Spectrometry

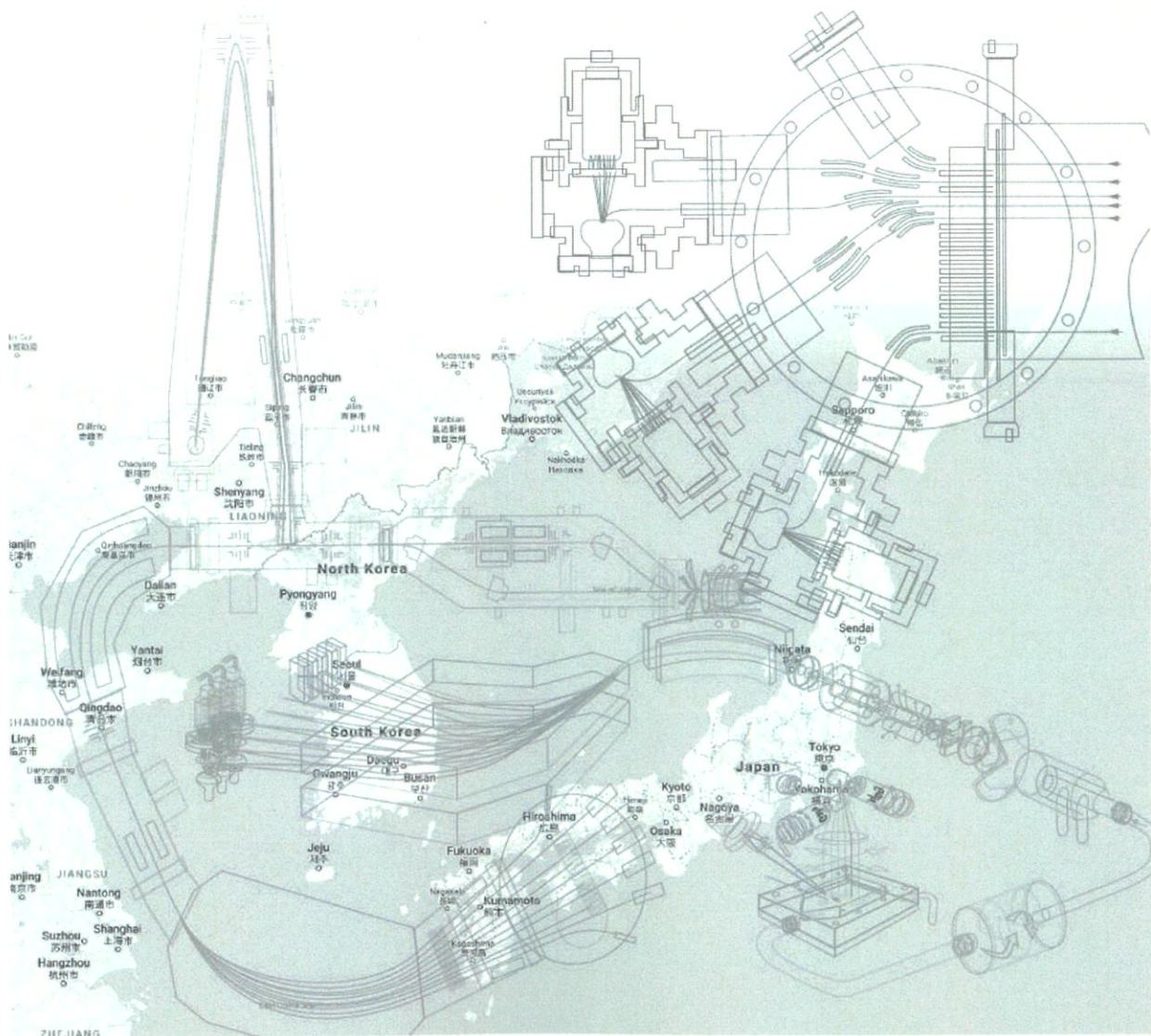
YOUSUNG HOTEL, 9 Oncheon-ro, Yuseong-gu, Daejeon

November 8 - 10, 2018

## 3<sup>rd</sup> Korea-Japan Joint Workshop on Isotope-Ratio Mass Spectrometry

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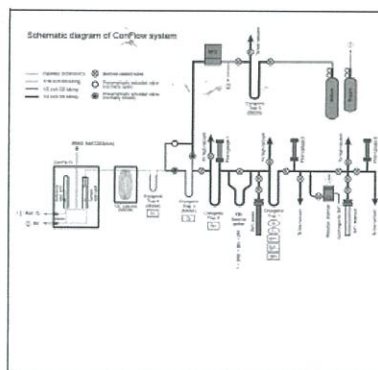
O-5

**Development of analytical system for determining oxygen isotope ratios of microgram-sized silicate using laser fluorination method combined with continuous flow system**

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We are developing an analytical system to measure <sup>17</sup>O/<sup>16</sup>O and <sup>18</sup>O/<sup>16</sup>O ratios of microgram-sized silicates. The system consists of vacuum line for extraction and purification of O<sub>2</sub> from a sample. The oxygen is extracted by CO<sub>2</sub>-laser BrF<sub>5</sub>-fluorination and then purified cryogenically. A sub-micromole quantity of oxygen is collected in a cold MSSA trap at liquid N<sub>2</sub> temperature. It is then transferred to a cryofocus trap (MSSA PLOT) for concentration under continuous helium flow. The sample gas passes through a GC column containing MSSA PLOT for further purification and separation from any gas other than O<sub>2</sub>. The purified oxygen is introduced into an ion source of the mass spectrometer through the open split interface. The system is being improved to achieve high precision oxygen isotope analysis.



O-6

**Establishment of mutual separation technique of rare earth elements using Ln-resin**

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The experimental method for mutual separation of a series of rare earth elements (REE) from La to Lu was developed and applied for their isotopic analyses in geological materials. The procedures for chemical separation consist of two-step of resin chemistry: the first step for the separation of a fraction including a group of REE from the major component elements in common silicate rocks by use of a cation exchange resin, and successively, the second step for a mutual separation of the individual REE by use of a lanthanoid-element specific resin (Ln-resin). Ln-resin is based on di-(2-ethylhexyl)-phosphoric acid (HDEHP) loaded on the polymeric adsorbent which is manufactured by Eichrom Technologies. Separation of REE using this resin is easier because HCl is used as an eluent, and there is no need for complicated preparation and purification. To confirm the validity of our chemical separation technique for isotopic studies of geochemical applications, isotopic analyses of Dy, Er, and Yb separated from two geological materials, JB-2 and JG-2 were performed using thermal ionization mass spectrometry (TIMS). This analytical technique provides high-quality isotopic data within 0.004% of analytical reproducibility (95% confidence level) for major isotopic ratios of Dy, Er, and Yb in geological samples.

