Akita University, Faculty of Integrated Science and Engineering for Environments

Laboratory of Mathematical Environmental Science

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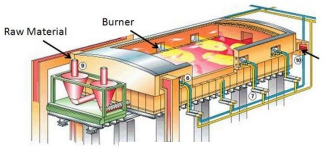
Research themes

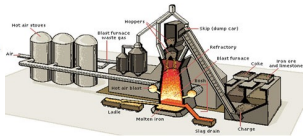
1970 Medake lava, Akita-Komagatake Volcano

Synplutonic dyke, Hida plutnic complex

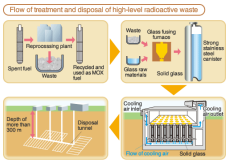
Earth and Environmental Sciences

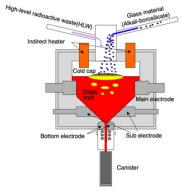


Industrial glass melter
http://www.glassonweb.com/articles/article/854/



Blast furnace
http://aerographite.com

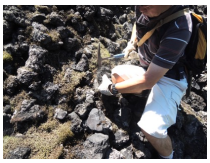




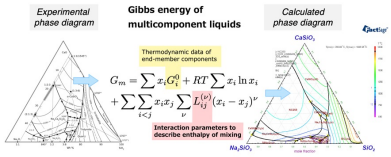
Geological disposal of high-level radioactive waste glass

Glass Science and High-temperature Industry

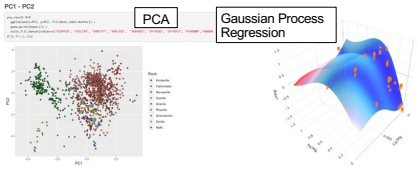
Methods



Field work and rock sampling



Thermodynamic analysis (CALPHAD)



Multivariate analysis using R and Python

Vertical box furnace (~1400℃)

Oxygen buffer control vertical furnace (~1650℃)

Phase equilibrium experiments

Drop calorimeter

Differential Scanning Calorimeter (Perkin-Elmer, DSC7)

Calorimetry of glass and molten oxide

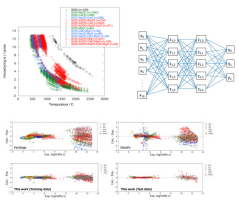
High-sensitivity, high-resolution ion microprobe (SHRIMP IIe)

Electron-probe Micro Analyzer (JEOL, JXA-8230)

X-ray Fluorescence (Rigaku, ZSX Orimus II)

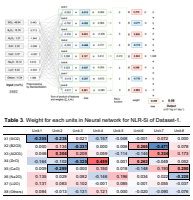
Micro and whole chemical analysis of rocks, minerals and inorganic materials

Recent works



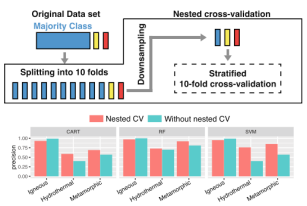
Neural Network analysis of viscosity of SiO_2-Al_2O_3-MgO-CaO-Na_2O melts

Sugawara et al. (2024) *The 188th ISIJ Meeting*, 30



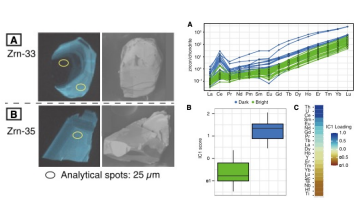
Machine learning of chemical durability of Japanese simulated high-level waste glass

Sugawara et al. (2024) *GLOBAL, International Conference on Nuclear Fuel Cycle, October 6-10, 2024, P-40*



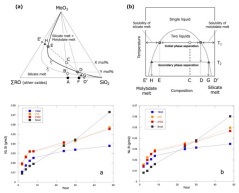
Geochemical classification of zircon source rocks using a machine learning approach

Itano and Swada (2024) *Mathematical Geosciences*, 1-22



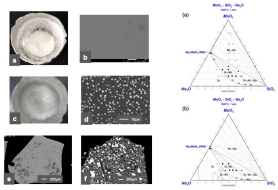
Geochronological and Geochemical study of zircon from ultramafic cumulative rocks

Itano et al. (2024) *Geology*, 52, 3-6



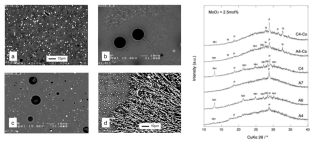
MoO_3 Solubility and Chemical Durability of V_2O_5-Bearing Borosilicate Glass

Nagata and Sugawara (2023) *Inorganics*, 11, 311



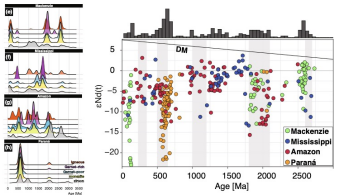
Phase equilibria and thermodynamic analysis of liquid–liquid immiscibility in the system SiO_2– Na_2O–MoO_3

Sugawara et al. (2024) *J. Therm. Anal. Calorim.*, DOI:10.1007/s10973-024-13659-7



Crystallization of molybdenum oxide phase from simulated high-level waste glass under slow cooling

Sugawara et al. (2022) *J. Ceram. Soc. Japan*, 130, 933-942



Crustal evolution revealed by monazite geochronology and Nd isotope tracer

Itano et al. (2024) *Chemical Geology*, 669, 122361