

## Infrastructure available at The University of Tokyo

- **Chemical Analysis Instruments:**
  - Inductively coupled plasma - optical emission spectrometry, (ICP-OES, Perkin-Elmer Optima 5300 DV)
  - Atomic absorption spectrometry, (AAS, HITACHI z-2000)
  - Ion chromatography, (IC/HPLC, HITACHI Elite LaChrom L-2470 L-2200 L-2130 L-2350)
  - Ultraviolet spectroscopy, (UV, HITACHI U-1800)
  - Fourier transform infrared spectroscopy, (FT-IR, JASCO FTIR-4200)
  - X-ray fluorescence spectroscopy, (XRF/WDS, RIGAKU Supermini200)
  - Electron microscopy with EDX-analyzing equipment, (SEM-EDS)
  - Raman spectroscopy, (Thermo Scientific DXR Smart Raman)
  - Gas Chromatograph, (GC, HITACHI G-3900)
- **Mineralogical, Surface and Image Analysis:**
  - Digital microscopy, (KEYENCE VH-5000)
  - X-ray diffractometry, (XRD)
  - Field Emission Scanning Electron Microscope, (FE-SEM)
  - Transmission electron microscopy, (TEM)
  - X-ray photoelectron spectroscopy, (XPS), (shared)
  - Extended X-ray absorption fine structure, (EXAFS), (shared)
  - Mineral Liberation Analyzer, (MLA), (shared)
- **Particle Characterization:**
  - Particle size measurement, (MicroTrac MT3000)
  - Particle sizes and zeta potential analyzer, (DLS/ELS, Otsuka Photal LS-2000F)
  - Surface area and pore size analyzer by N<sub>2</sub> gas sorption, (BET Surface Area Analyzers, Quantachrome NOVA 2200e/TFII)
  - Surface Force Apparatus, (SFA)
- **Material Testing Equipment:**
  - Vibrating sample magnetometer, (VSM, Tamakawa)
  - Rheometer, (SHIMADZU RM-1)
  - Calorimeter, (SHIMADZU CA-4AJ)
  - Thermal analysis (TG/DTA, RIGAKU Thermo plus EVO TG8120)
  - Scintillation survey meter, (HITACHI TCS-172)
  - Becquerel Monitor, (BERTHOLD LB200)
  - Powder resistivity measurement system, (MITSUBISHI MCP-PD51), (shared)
- **Leaching Set-up:**
  - Leaching columns
  - pH-stat
- **Immobilization Equipment:**
  - Adsorption and (co-)precipitation
- **Physical Separation Equipment:**
  - Superconducting Magnet (6T)

- Eddy Current Separator (shared)
- Dry Magnetic Separator
- Wet Magnetic Separator
- High-tension Separator (shared)
- Falcon Concentrator
- Air Table (shared)
- Denver type flotation cell
- Microbubble flotation cell
- **Thermal Treatment Equipment:**
  - Electric furnace, (KOYO KBF 1700°C)
  - Electric furnace, (ISUZU 800°C)
  - Electric furnace, (AS ONE HPM-1N)
- **Size Reduction Equipment:**
  - Jaw crusher
  - Ball mill
  - Planetary ball mill (FRITSCH)
  - Ultrafine grinding mill (ASHIZAWA FINETECH NANO GETTER DMS65)
  - Shredded (shared)
- **Software Packages:**
  - USIM PAC
  - HSC for Chemistry
  - FactSage
  - Surfer
  - MINEQL+
  - VisualMinteq
  - ChemDraw
  - Gaussian
  - MatLab
  - NIRE-LCA Ver. 3