**Sustainability programs with international collaborations at Navoi State University of Mining and Technologies**

1. **The Project “Master Program in Eco-Mining Engineering and Innovative Natural Resources Management (EMINReM)”**

Wider Objective is to raise efficiency and ecological sustainability of mining works realization through the Partner-HEIs collaboration for training of new-generation-experts within environmental, economic and management attainments in the field of natural resources extraction and processing. It is aimed at development of the future experts` interdisciplinary openness, capability of understanding technological issues in a systematic and in-depth way, using the tools of modeling and evaluation of potential environmental risks, mitigating them in our fast-developing world. MP in EMINReM is created in response to the current challenges of sustainable development and market needs.

1. **The Project for the Development of synthetic methods for the preparation of high-value zeolites Ca-A-5A and 13X molecular sieves from local kaolinite for natural gas purification**
2. Research Goals and Contents:

* Research Goals-Development of zeolite molecular sieve synthesis method for natural gas separation form kaolinite. The porous materials will be applied as adsorbents for natural gas separation;
* Research Contents-Uzbekistan kaolinite analysis, and selection for raw materials. Establishment of a zeolite synthesis system Uzbekistan;
* Expected Outputs-Selection of candidates for kaolinite raw materials;
* Others.

1. Responsibilities:
   1. KRICT’s Responsibilities: Establish CH/CO, adsorption measurement, and breakthrough system feed from CH/CO;
   2. Partner’s Responsibilities: Establish zeolite synthetic devices in Navoi State University of Mining and Technologies. Analysis of possible candidates for local chaolite, which can be used as zeolite synthesis (CnA. X zeolite).
2. Research Schedule
   1. Tasks:

* Analysis of local kaolinite, and select the possible candidate for zeolite synthesis. Set up zeolite synthetic system in Navoi State University of Mining and Technologies Set up adsorption and separation system for CHa/CO.
  1. Outputs *(Milestones)*;
* Development of zeolite synthetic method form local kaolinite to yield a Ca-A and 13X molecular sieves.

1. **The Project for Development of Innovative Technologies for Efficient Generation of Green/Blue Hydrogen for Realization of Carbon-neutral Society with Consideration of Industrial and Environmental Characteristics**

Within the framework of the project funded by Japan’s Science and Technology Research Partnership for Sustainable Development (SATREPS), titled “Development of Innovative Technologies for the Efficient Production of Green/Blue Hydrogen to Achieve a Carbon-Free Society, Considering the Industrial and Environmental Characteristics of the Region,” the following modern technologies are being studied by NSUMT scientists in Kyushu University laboratories:

* using unused land (deserts, steppes) and solar energy for electricity generation to produce hydrogen via electrolysis and green hydrogen production.
* producing blue hydrogen from residual oil in oil fields.
* producing green hydrogen through high-efficiency steam electrolysis powered by solar panels and utilizing solar heat as a heat source (also using waste heat and steam from Navoi’s LNG combined power station, among others).

1. **Training young resource information researchers by establishing a reserch and education center for sustainable resource development in countries with economies in transition**

Since April 2021, a grant project funded by the Japan Society for the Promotion of Science (JSPS) titled "Establishment of a Research and Education Center to Enhance the Potential of Young Researchers in Sustainable Resource Development in Central Asian Countries" has been underway. As part of the project, scientific internships are organized for professors, doctoral students, and students of Akita University and Navoi State Mining and Technology University. These include summer schools in Japan, and scientific internships in Akita and Navoi. In 2022-2023, 17 students from Japan participated in an academic exchange program at NSUMT, while 4 students and 3 professors from NSUMT completed internships at Akita University.