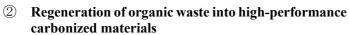
Name Job Title Area of Expertise
OMINE Kiyoshi Professor Geo-Environmental Engineering

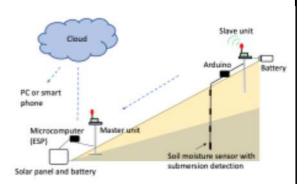
1. Main Research Topics

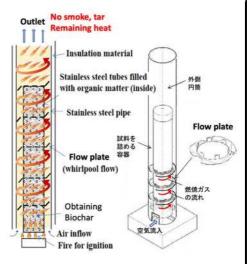
① Development of IoT ground deformation detection sensors for ground disaster

We develop an IoT ground deformation detection sensor that can visualize groundwater distribution on slopes by creating a simple sensor that can detect deformation and water inundation in the ground and combining it with low-power wide-area wireless communication (LPWA) that can operate for a long time with dry batteries. We aim to put this into practical use by using an inexpensive device that can visualize measurement results in real time via the Internet.



We develop gasifier of organic waste without using fossil fuels, that regenerates a high-performance carbonized material, and achieves carbon negative, which reduces CO2 emissions. Using a newly developed pyrolysis gasification device, we are investigating the application of highly water-absorbent carbonized materials as a soft ground improvement material, porous carbonized materials as an adsorbent for deodorizing and purifying wastewater, and carbonized materials with low electrical resistance as electrodes for soil microbial batteries, as well as the application of these materials as water-retaining materials for desert greening and land degradation countermeasures.



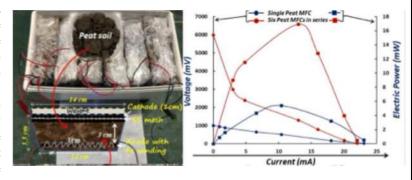


3 Mud dewatering technology that takes environmental impact into consideration

To effectively utilize mud with a high water content, a technology that can dewater without using energy is required. By combining drainage materials with a vacuum pump, we aim to improve the dewatering effect, while using a vacuum pump powered by a solar panel to realize a fossil fuel-free, environmentally friendly dewatering technology. We have confirmed its effectiveness through on-site dewatering tests using construction sludge and water purification sludge.

Development of soil microbial fuel cell

Soil microbial fuel cells are a new form of clean energy. We are developing compost-type microbial batteries that generate electricity through the metabolism of microorganisms during the composting of organic waste that generate electricity while cultivating plants. These batteries are being used to light up LEDs and as a power source for small sensors.



2. Keywords

Geoenvironmental engineering, Geodisaster prevention, Utilization of waste, Soil microbial fuel cell

3. Remarks and Websites

The project aims to solve global environmental problems such as landslides and land degradation caused by climate change, and to reduce and fix carbon dioxide emissions through the effective use of waste. **researchmap:** https://researchmap.jp/read0043302

Laboratory: https://www.cee.nagasaki-u.ac.jp/~jiban/