Study for TPH removal efficiency of landfarming process using indigenous microorganisms to diesel contaminated site

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Landfarming is the representative process to use the biodegradation by using microorganisms and it is considered to be more economical and pre-environmental than other process to remediate fuel-contaminated sites. The feasibility of landfarming process using indigenous microorganisms, living in diesel contaminated soils of a military camp was investigated by batch experiment. Initial TPH concentration of soil sample in the study was 3, 819 mg/kg and the soil was classified to 'Sand' for USDA soil texture group. The average water content was 1.19 % and soil pH was 8.29. For the experiment using indigenous microorganisms, total four microorganisms (*Arthrobacter* sp., *Burkhoderia* sp., *Cupriavidus* sp. and *Bacillus* sp.) were isolated from two diesel contaminated soils from a military camp, Korea. Batch experiments were performed to investigate the TPH removal efficiency with different conditions for 1 month. In the petri dish (15 cm in diameter x 2 cm in depth), 300 g of soil were mixed with each isolated microorganism solutions (0.3 ml and 0.6 ml) and nutrient (0.3 ml). The ratio of C:N:P in the nutrient was 100:10:1. Various water contents (10 % and 20 %) and temperature (20 ℃, 30 ℃ and 40 ℃) were applied to the experiments. The humidity of batch soil decreased due to the vaporization and the distilled water was added into the batch soil every 48 hours to maintain a constant humidity.

After 31 days of experiment, the greatest TPH removal efficiency was 95 % by using *bacillus* sp.. The average TPH removal efficiency of four microorganisms was 76.5 %, suggesting that the landfarming process using indigenous microorganisms is successful to remove TPH from diesel contaminated soils.

Microstructure of Yuka eclogite, North Qaidam HP/UHP terrane, Northwestern China

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This study aims at further understanding of the mechanisms how lattice-preferred orientation (LPO) developed during the HP-UHP metamorphism in the eclogites. Microstructures of Yuka eclogites from North Qaidam HP/UHP terrane, northwestern China were analyzed using optical microscopy and electron backscattered diffraction (EBSD) in order to determine the LPOs of minerals and deformation mechanisms. The LPOs of omphacite showed that [001] axes are alligned parallel to lineation and [010] axes distributed within a girdle normal to lineation which is known as the L-type fabric, while the garnets showed a week LPO. The fabrics of quartz showed a weak rhomb <a> slip system which the C{0001} axis pole figures present patterns which form a girdle in the plane normal to the lineation. To determine water content of minerals we used the Nicolete 6700 FTIR with a Continuum IR microcroscope in the Tectonophysics Laboratory in SEES in Seoul National University. Unpolarized FTIR analysis of samples showed that two hydroxyl absorption bands at 3430 – 3530 cm^{-1} and 3600 – 3620 cm^{-1} exist in the omphacite grains indicating the deforrmation of omphacite in a wet condition, while there was no O-H peak observed in garnet and quartz minerals indicating deformation of the minerals in a dry condition. The presence of strong LPOs in omphacite suggests that dislocation creep was a dominant deformation mechanism of omphacite, but the garnet grains appear to be deformed by other mechanisms (e.g. grain boundary sliding). Quartz grains appear to be deformed by the dislocation creep mechanism in a dry condition, and the weak LPOs of quartz may have been caused by the later stage deformation and metamorphisms.