Mineralogical, petrographical and geochemical investigation of Tefenni-Burdur chromite occurences

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The lithological units are consist of Late Jurassic – Early Createaous aged Yeşilova ophiolites, Upper Cenonian aged Kızılcadağ ophiolitic melange, Pliyo-Quaternary aged Niyazlar Formation and Quaternary aged alluvions in the investigation area.

Yeşilova ophiolite consist of tectonites, ultramafic and mafic cumulates, isotropic gabbros, plagiogranites and basalts from bottom to top. Yeşilova ophiolite in which sheeted dike complex and pillow lavas are not seen, represents an ophiolite group with missing row character.

In the bottom of the Yeşilova ophiolite there are tectonics ,which is composed of harzburgite, dunite, serpantinized harzburgite and dunite, serpantinite and chromite masses with dunitic envelope. Tectonites are mostly serpantinized in parts where mafic dikes are dense and along tectonic lines. Tectonites are cut by many mafic dikes.

According to the metamorphic paragenesis determined in the oceanic crust rocks forming Yeşilova ophiolite, it is metamorphised in P/T situations which does not reach the sub limit of greenschist facies.

Upper Cenoniyen aged Kızılcadağ ophiolitic melange takes place tectonically on Yeşilova ophiolite. Tectonic boundry between these to units is nearly horizontal.

Role of submicron-sized particles on the ^{134,137}Cs migration in Fukushima

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In the vicinity of Fukushima Daiichi Nuclear Power Plant (FDNPP), ^{137}Cs ($T_{1/2}$ = 30.07 y) and ^{134}Cs ($T_{1/2}$ = 2.062 y) have great contribution to the radiation dose. Although the initial distribution of radionuclides derived from FDNPP accident have been reported to date, there are limited knowledge on micron- and submicron-scale distribution and migration of ^{134,137}Cs in the surface and sub-surface environments. In order to understand the fundamental mechanism of ^{134,137}Cs retention and migration in the contaminated area in Fukushima, Cs speciation in various environmental samples (soils, aerosol and groundwater) is investigated, which were collected from severely contaminated area in Fukushima.

In the soil samples, the vertical profile of ^{134,137}Cs distribution revealed that >98% of ^{134,137}Cs remained within top 5 cm. Sequential extraction of the contaminated soils revealed that most ^{134,137}Cs was strongly bound to high-affinity site of clay minerals such as illite and montmorillonite, while upto 20% of ^{134,137}Cs was present as an ion exchangeable form, suggesting that elution of ^{134,137}Cs from soil minerals would be minimal in the surface environment in Fukushima. In the size fractionation experiment, ~78% of ^{137}Cs was distributed in the colloid region (<1 μm) and the concentration was as high as ~3,000,000 Bq/kg. The ^{137}Cs radioactivity of airborne particles collected in Iitate was measured to be 12.2, 15.7, and 11.8 mBq/m^3 for the size fractions of <0.4, 0.4-2.5, and >2.5 μm, respectively. ^{134,137}Cs were under the detection limit in the groundwater samples. These results clearly indicate that ^{134,137}Cs have not migrated to the groundwater system until one year after the accident, and the airborne Cs-particles were mainly derived from suspension of the fine fraction of the contaminated soils, namely Cs-bearing clay minerals.

The present study strongly suggests that the migration of ^{134,137}Cs in the surface and sub-surface environment is not governed by the adsorption-desorption cycle but by the behavior of Cs-adsorbed submicron-sized particles. Therefore, the unique physico-chemical property of Cs-bearing colloids should be taken into account for predicting the future behavior of ^{134,137}Cs in the surrounding environments in Fukushima.

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