

Restoration of Cd-contaminated Farmland by the Electrokinetic Method (1)

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The heavy metal pollution of the farmland soil diffuses in the process of supply of polluted irrigation water and spreading of smoke from the refining plant. The heavy metal concentration of the polluted farmland soil is relatively low and diffuses over a wide area. Since such a feature of heavy metal pollution in the farmland, the soil dressing is basic method of easy application for heavy metal remediation. However, the polluted soil remains still in the lower layer part of the farmland to which the soil dressing was applied. The sucking in the heavy metal by the deep-rooted upland crop and the soil re-deposition from the polluted soil at lower layer are feared.

The electrokinetic method is a technique on removing polluted materials by energizing direct current to the soil, and generating an electrophoresis and an electroosmotic flow. Application of this method seems to have effect of reduction for heavy metal content in the polluted soil. To acquire basic data on application of this technique to the polluted area, the electrokinetic experiment that the cadmium polluted farmland soil was supplied as test soil was carried out.

The instrument used for this experiment was boxes made of the acrylic fiber divided into three room by the filter. Center room of the box was the tank filled with polluted soil, and right and left room was the electrolyte solution tank where the anode and the cathode had been putted in. We energized direct current for two weeks and examined the time changes of the heavy metal concentration in the electrolyte solution and change in the heavy metal contents extracted with 0.1 M HCl of the polluted soil. We divided the polluted soil into three parts, that were the anode side, the center part, and the cathode side, to measure heavy metal contents in each part. The content of the cadmium in polluted soil decreased to 10 % or less after two weeks passed. Therefore, enough removal effect of the electrokinetic method was confirmed.