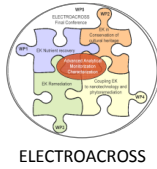


DCEA- Department of Environmental Sciences and Engineering

Electrodialytic treatment of different polluted matrices and their applicability

Center for Environmental and Sustainability Research
Environmental assessment, monitoring and remediation
Lab. 347 – Remediation Group



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Researcher (fellowship)

MSc in Environmental Engineering (2014)

Thesis title: Electrolytic remediation of two types of air pollution control residues and their applicability in construction materials

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Objectives

Characterization of **air pollution control (APC)** residues from different types of cleaning air system. Development a second reuse of APC residues, by their incorporation in construction materials. Electrolytic (ED) process as a pre-treatment, reducing toxicity and leaching of heavy metals in contaminated matrices.

ED process is also being applied to remove organic contaminants and/or heavy metals from **sewage sludge or sewage sludge ash**, as well as to recover phosphorus.

The main aim is to promote a more effective, sustainable and integrated process, in the incineration plants and wastewater treatment plants. To promote a more efficient management of P-nutrient cycle.

Methodology

ED process uses a low level direct current between one pair of electrodes. The current acts as a cleaning agent. This current induces transport mechanisms by which the contaminants are removed from the matrix towards the electrode compartments, where they can be removed, treated and recycled.

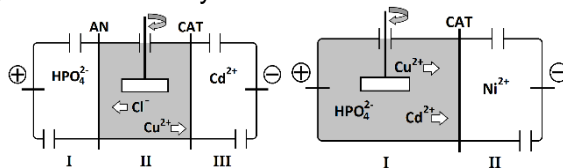


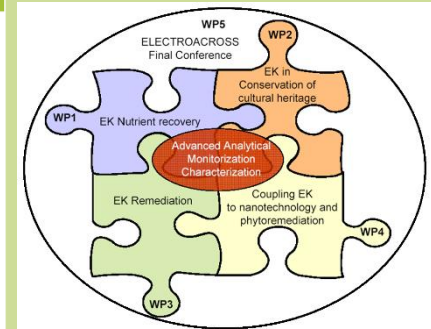
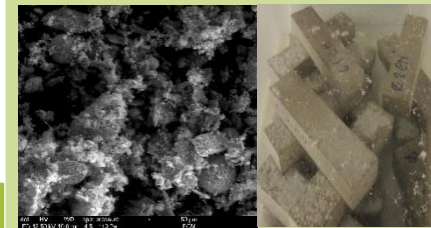
Figure 1. The experimental set-up of the three and two compartment electrolytic cell. AN-anion exchange membrane, CAT-cation exchange membrane.

Expected Results

For reuse purposes, the aim of the remediation is to reduce the organic and inorganic contaminants and their leaching, while trying to keep the matrix characteristics. Thus, the expected results are:

- ❖ Development/optimization of ED process (mechanisms, ED reactions and separation of contaminants);
- ❖ Upgrade of contaminated matrices, so they can have added value with a second reuse:
 - APC residues - to substitute cement in mortars for construction materials;
 - Sewage sludge or sewage sludge ash - recycling and recovery of phosphorus so it can be reused, e.g., agriculture.

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ELECTROACROSS - Electrokinetics across disciplines and continents: an integrated approach to finding new strategies to sustainable development

