

# First trials in electrokinetic remediation of heavy metals from a contaminated marine dredged sediment from a European port

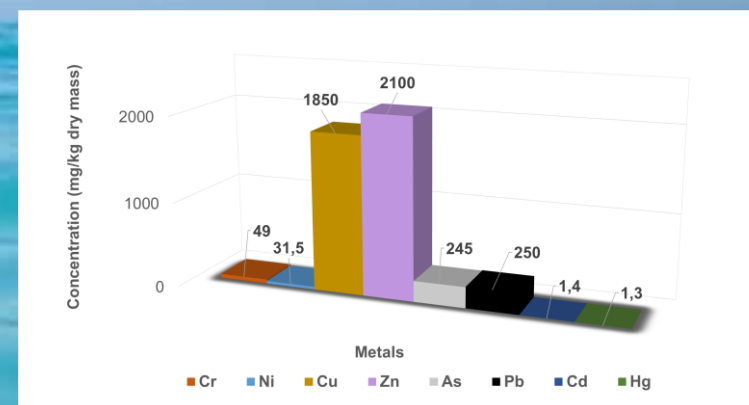
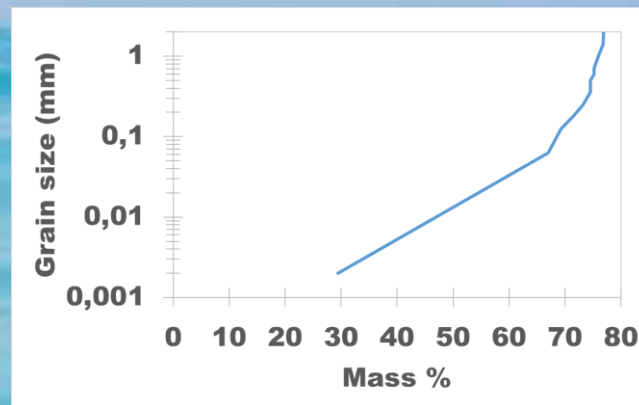
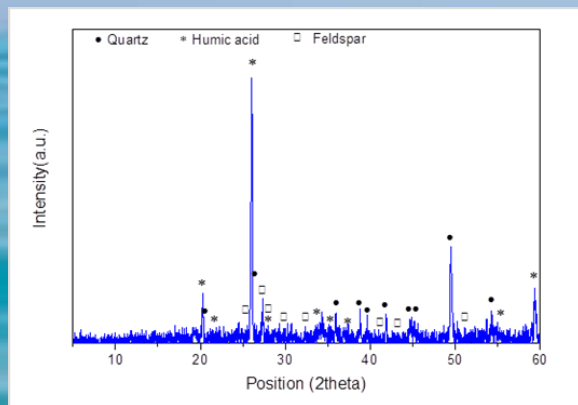
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**Poster 99**



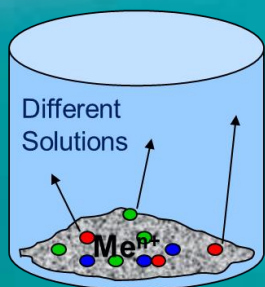
# Characterization of the sediment



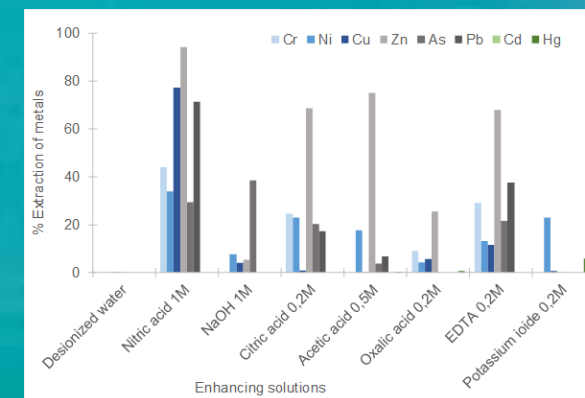
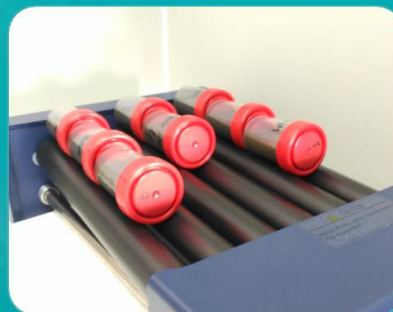
CaCO <sub>3</sub> (g/kg)	Total organic carbon (TOC) (g/kg)	Solids concentration (mass %)	Agglomerated mass (g)	Dry matter (mass %)	Microtox solid phase test
10,2	21	33	0	34,85	>16 g/L of sediment

Organic compounds	mg/kg
Total Organostannic compounds	<0,09
Total Polycyclic Aromatic Hydrocarbons (PAH)	<0,48
Total Petroleum Hydrocarbons (TPH): C10-C40	70
Total Polychlorinated Biphenyl (PCB): 28, 52, 101, 118, 138, 153, 180	<0,007

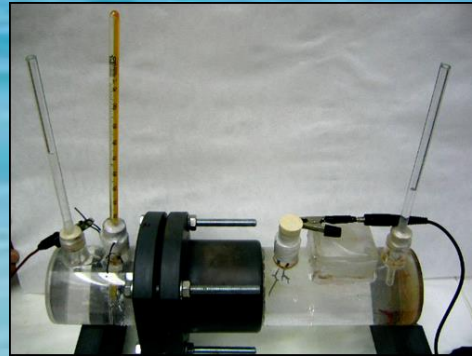
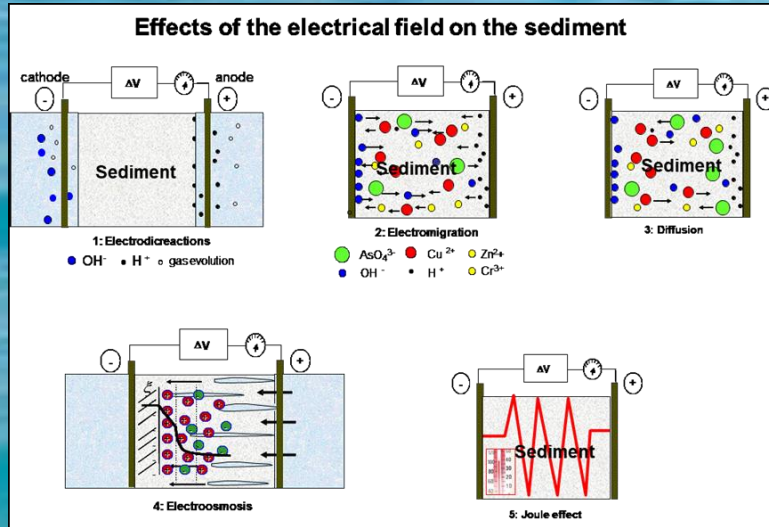
## Equilibrium tests



- Desionized water
- Nitric acid 1M
- Sodium hydroxide 1M
- Citric acid 0,2M
- Acetic acid 0,5M
- Oxalic acid 0,2M
- EDTA 0,2M
- Potassium ioide 0,2M



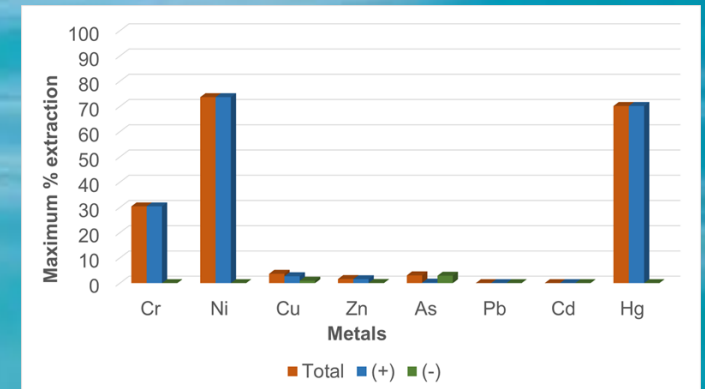
# Electrokinetic remediation trials



Test	Anolyte	Catholyte	Direct Electrical field (V)
1	Water	Water	No
2	Water*	Water	12, 20, 30
3	Water	Acetic acid	12

- Samples: pH, conductivity, voltage, intensity, electroosmotic flux, metals and Infrared spectroscopy
- \*During the last week, samples taken were replaced by H<sub>2</sub>O<sub>2</sub>
- Tests 1 and 2: 3 weeks, Test 3:1 week

Maximum % extraction of metals in test 2



## Conclusions

- **Metal extraction in equilibrium tests:** concentrated HNO<sub>3</sub> for Cu, Zn and Pb. NaOH for As. EDTA for Cr.
- **Metal extraction in electrokinetic remediation trials:** acetic acid at 12V > extraction than water at 30V.
- Design of the remediation process should incorporate the particularities of the different contaminants in their interaction with the extracting solutions and the characteristics of the sediment.

**Poster 99**