



SOILS CONTAMINATED WITH HEXAVALENT CHROMIUM - SORPTION, MIGRATION AND REMEDIATION

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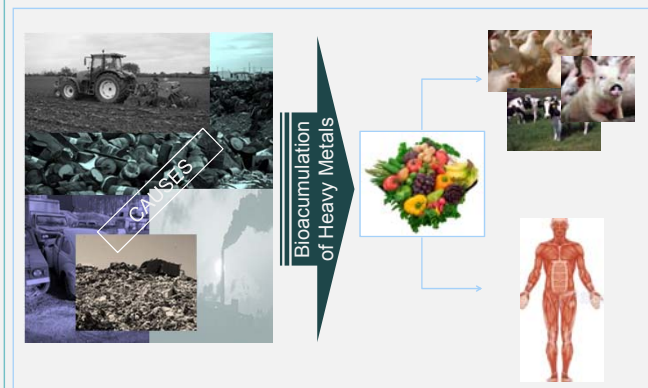
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Why?



What about Europe?

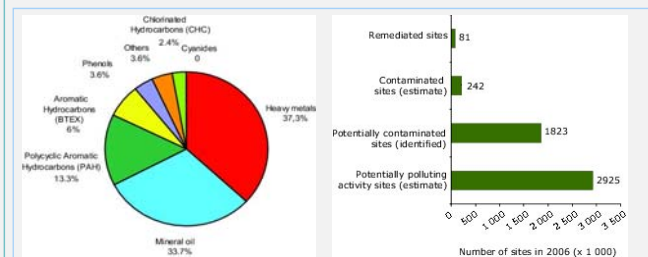
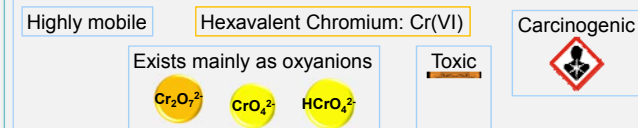


Figure 1. Overview of contaminants affecting soil and groundwater and the status of identification and clean-up of contaminated sites in Europe, as reported to the European Environment Agency through the EIONET priority data flows on contaminated sites.

Target

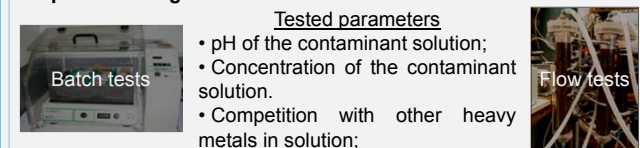


How?

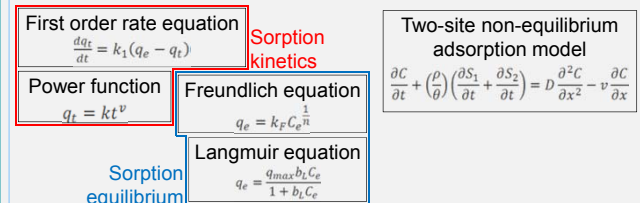
Sampling



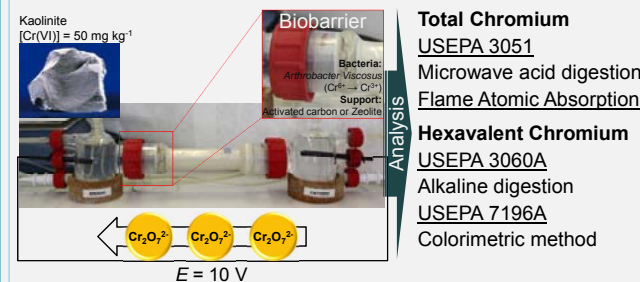
Sorption and Migration



Mathematical Modelling



Electroremediation/Biobarriers



Results (Highlights)

Sorption and Migration

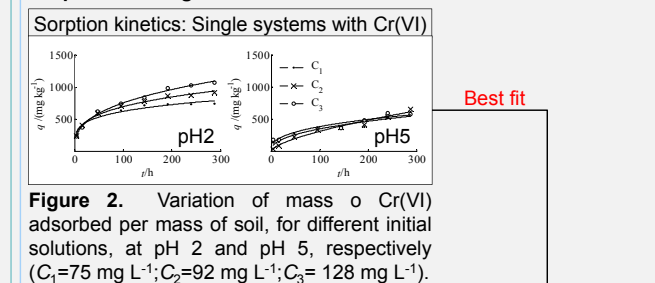


Figure 2. Variation of mass of Cr(VI) adsorbed per mass of soil, for different initial solutions, at pH 2 and pH 5, respectively (C₁=75 mg L⁻¹; C₂=92 mg L⁻¹; C₃= 128 mg L⁻¹).

The rate constant increases with the solution concentration

The maximum sorption capacity decreases with pH and concentration increasing

pH	C _i (mg L ⁻¹)	Empirical power function				R ²
		k	Cl	v	Cl	
2	75	217.6	66.2	0.226	0.061	0.893
	92	185.7	36.6	0.285	0.039	0.989
	128	146.4	36.1	0.354	0.040	0.993
	154	115.6	36.1	0.377	0.061	0.987
	172	142.5	28.0	0.364	0.038	0.984
5	189	94.3	35.4	0.405	0.073	0.985
	204	78.6	22.8	0.435	0.056	0.991
	78	36.1	32.6	0.461	0.174	0.935
	98	13.7	11.8	0.663	0.161	0.979
	131	53.8	66.6	0.388	0.247	0.820

Electroremediation/Biobarriers

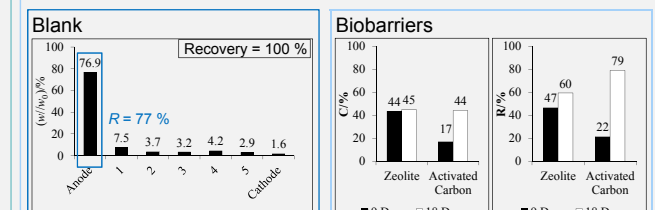


Figure 3. Distribution of the Cr(VI) across the electrokinetic cell

Cr(VI) oxyanions migrated towards the anode chamber.

$R_{carbon} > R_{zeolite}$

Figure 4. Fraction of Cr(VI) reduced to Cr(III) - C% - and total removal of the Cr(VI) - R%.

In general...

- Conversion_{18d} ≈ Conversion_{9d}
- Removal_{18d} > Removal_{9d}

For Activated Carbon...

- Conversion_{18d} > Conversion_{9d}
- Removal_{18d} > Removal_{9d}

Acknowledgments

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