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Enhanced cesium removal from real matrices by nickel-hexacyanoferrate modified activated carbons

S.R.H. Vanderheyden, J. Yperman, R. Carleer, S. Schreurs



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1 Enhanced cesium removal from real matrices by nickel-
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3 S. R. H. Vanderheyden^{a*}, J. Yperman^a, R. Carleer^a, S. Schreurs^b

4 ^a Hasselt University, Centre for Environmental Sciences, Research Group of Applied and
5 Analytical Chemistry, Agoralaan – Building D, 3590 Diepenbeek, Belgium; e-mail:
6 jan.yperman@uhasselt.be; robert.carleer@uhasselt.be

7 ^b Hasselt University, Centre for Environmental Sciences, Research Group of Nuclear
8 Technology, Agoralaan – Building H, 3590 Diepenbeek, Belgium; e-mail:
9 sonja.schreurs@uhasselt.be

10 * Corresponding author: Sara R.H. Vanderheyden, sara.vanderheyden@uhasselt.be +3211
11 [268211](tel:268211)

12 **Abstract**

13 After nuclear disasters, radioactive cesium partitions to soils and surface water, where it decays
14 slowly. Hexacyanoferrates (HCFs) have excellent cesium removal properties but their structure
15 is typically powdery. Many carrier materials, such as biomass or magnetic particles, have been
16 used to provide a suitable substrate for HCFs that can be used in filters. This research uses the
17 sorption properties of activated carbon (AC) to incorporate Ni-HCF, resulting in good structural
18 properties of the hybrid material. These HCF-modified ACs show drastically improved sorption
19 properties towards Cs after one, two and three HCF impregnation cycles. The activated carbon
20 from brewer's spent grain with one modification cycle removes more than 80% of 1 mg L⁻¹ Cs
21 in a sea water solution and more than 98% of 1 mg L⁻¹ Cs from surface water at a low AC
22 dosage (0.5 g L⁻¹). Iron and nickel leaching is studied and found to be dependent on the type of

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