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Nanomaterials application for heavy metals recovery from polluted water: the combination of nano zero-valent iron and carbon nanotubes. Competitive adsorption non-linear modeling



Giorgio Vilardi, Thanasis Mpouras, Dimitris Dermatas, Nicola Verdone, Angeliki Polydera, Luca Di Palma

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1 **Nanomaterials application for heavy metals recovery from polluted water: the combination of**
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4 Giorgio Vilardi^{1*}, Thanasis Mpouras², Dimitris Dermatas², Nicola Verdone¹, Angeliki Polydera²,
5 Luca Di Palma¹

6

7 ¹Department of Chemical Materials Environmental Engineering, 'La Sapienza' University of Rome,
8 Rome, Italy

9 ²School of Civil Engineering, Department of Water Resources and Environmental Engineering,
10 National Technical University of Athens, Iroon Polytechniou 9, 157 80 Zografou, Athens, Greece

11

12 ***corresponding author:** giorgio.vilardi@uniroma1.it

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14

15 **Abstract**

16

17 Carbon Nanotubes (CNTs) and nano Zero-Valent Iron (nZVI) particles, as well as two
18 nanocomposites based on these novel nanomaterials, were employed as nano-adsorbents for the
19 removal of hexavalent chromium, selenium and cobalt, from aqueous solutions. Nanomaterials
20 characterization included the determination of their point of zero charge and particle size
21 distribution. CNTs were further analyzed using scanning electron microscopy, thermogravimetric
22 analysis and Raman spectroscopy to determine their morphology and structural properties. Batch
23 experiments were carried out to investigate the removal efficiency and the possible competitive
24 interactions among metal ions. Adsorption was found to be the main removal mechanism, except for
25 Cr(VI) treatment by nZVI, where reduction was the predominant mechanism. The removal efficiency

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