

Article

Activated Carbon / Transition Metal (Ni, In, Cu) Hexacyanoferrate Nanocomposites for Cesium Adsorption

Julien Kiener ^{1,2}, Lionel Limousy ^{1,2}, Mejdı Jeguirim ^{1,2}, Jean-Marc Le Meins^{1,2}, Samar Hajjar-Garreau ^{1,2}, Gaetan Bigoin ³, and Camélia Matei Ghimbeu ^{1,2,*}

¹ Université de Haute-Alsace, CNRS, Institut de Science des Matériaux de Mulhouse (IS2M) UMR 7361, F-68100 Mulhouse, France; julien.kiener@yahoo.com (J.K.); Lionel.limousy@uha.fr (L.L.); Mejdı.jeguirim@uha.fr (M.J.); Jean-Marc.Le-meins@uha.fr (J.M.); samar.hajjar@uha.fr (S.H.)

² Université de Strasbourg, F-67081 Strasbourg, France

³ ONET Technologies, 36 Bd de l'Océan-CS 20280, 13258 Marseille, France; gbigoin@onet.fr

* Correspondence: camelia.ghimbeu@uha.fr; Tel.: +33 (0) 3 89 60 87 43

Received: 22 March 2019; Accepted: 12 April 2019; Published: date

Table 1. Atomic quantification of pristine C and C-HNO₃ modified carbon matrix.

Element Material	XPS quantification (at. %)		EDX quantification (at. %)	
	C	Cox	C	Cox
C	85.9	73.8	84.8	75.9
O	12.9	23.4	14.4	23.6
P	1.2	0.2	0.8	0.6
N	-	2.3	-	-

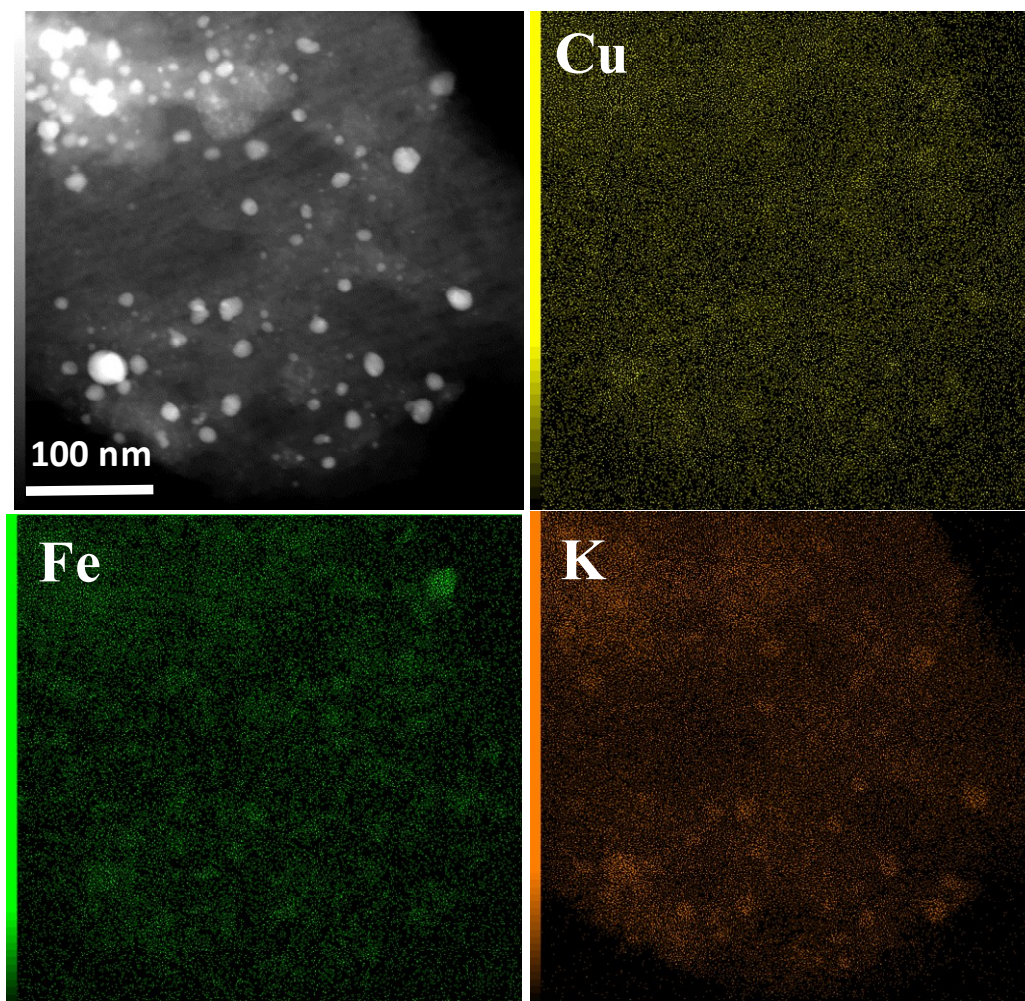


Figure 1. EDX mapping of C/CuHCFE material showing the copper, iron and potassium presence in the nanoparticles.

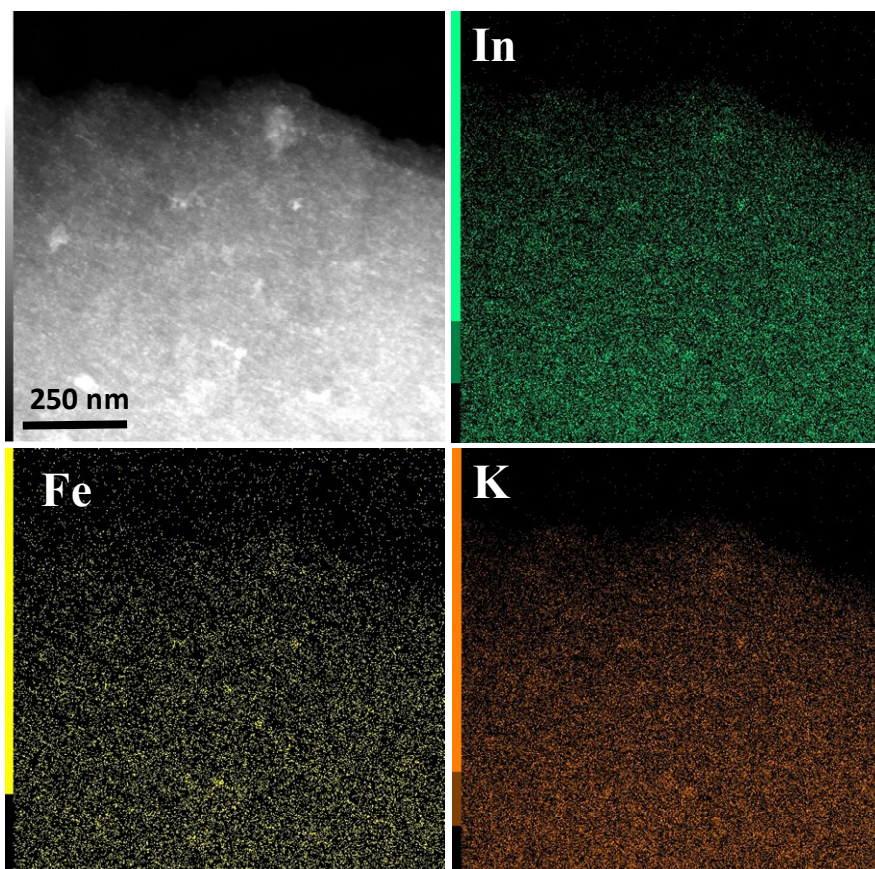


Figure 2. EDX mapping of C/InHCFE material showing the potassium, indium and iron presence in the nanoparticles.

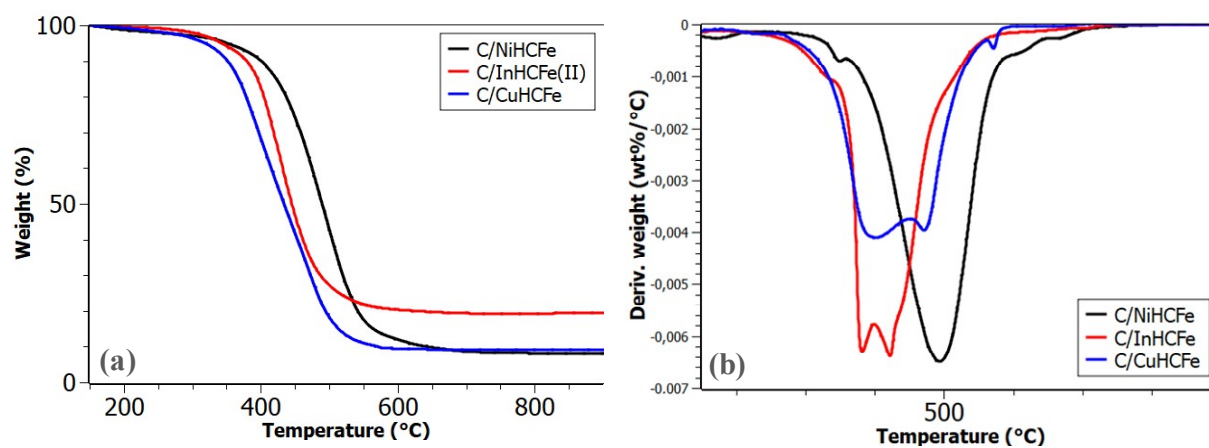


Figure 3. TGA analyses under air on C/HCFE nanocomposites (a) the weight loss and (b) derivative weight loss.

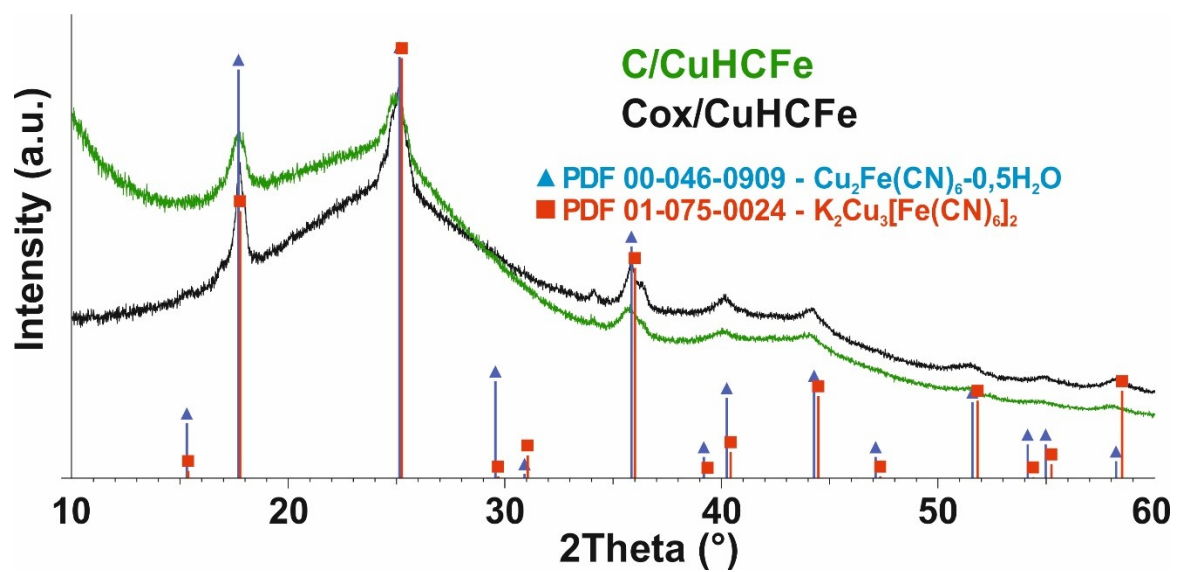


Figure 4. X-ray diffractograms of C/CuHCFe and Cox/CuHCFe. Vertical bars indicate peaks position of the related phase $\text{Cu}_2\text{Fe}(\text{CN})_6 \cdot 0.5\text{H}_2\text{O}$ and $\text{K}_2\text{Cu}_3[\text{Fe}(\text{CN})_6]_2$.