

Supplementary Material

Zn and Zn-Fe Nanostructures with Multifunctional Properties as Components for Food Packaging Materials

Hafsa Lamsaf ^{1,2}, Lina F. Ballesteros ^{3,4}, Miguel A. Cerqueira ², José A. Teixeira ^{3,4}, Lorenzo M. Pastrana ², Luís Rebouta ¹, Sandra Carvalho ⁵ and Sebastian Calderon V ^{1,2,*}

¹ CF-UM-UP, Centre of Physics of Minho and Porto Universities, Campus of Azurém, 4800-058 Guimarães, Portugal; hafsa.lamsaf@gmail.com (H.L.); rebouta@fisica.uminho.pt (L.R.)

² INL—International Iberian Nanotechnology Laboratory, Av. Mestre José Veiga s/n, 4715-330 Braga, Portugal; miguel.cerqueira@inl.int (M.A.C.); lorenzo.pastrana@inl.int (L.M.P.)

³ CEB—Centre of Biological Engineering, University of Minho, Campus of Gualtar, 4710-057 Braga, Portugal; linafernanda37@ceb.uminho.pt (L.F.B.); jateixeira@deb.uminho.pt (J.A.T.)

⁴ LABBELS—Associate Laboratory, Braga/Guimarães, Portugal

⁵ CEMMPRE, Mechanical Engineering Department, University of Coimbra, 3030-788 Coimbra, Portugal; sandra.carvalho@dem.uc.pt

* Correspondence: secave44@gmail.com

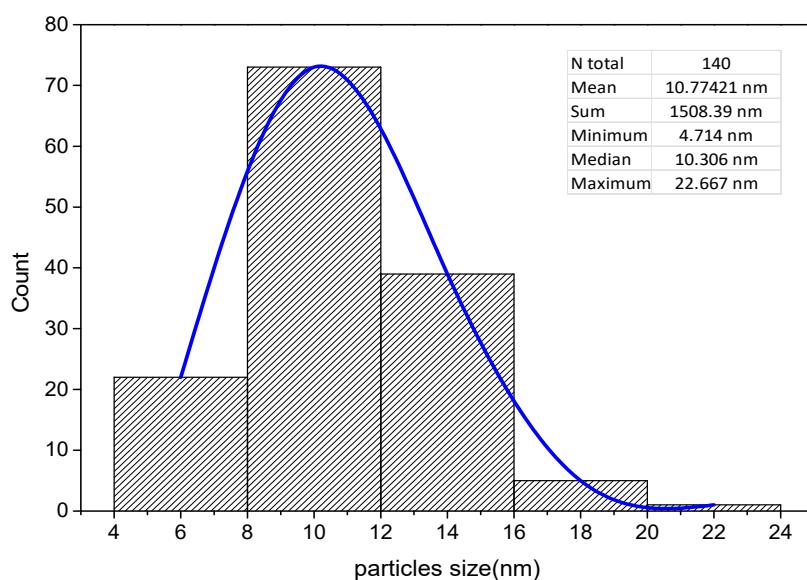


Figure S1. Size distribution of Fe particles in Zn NPs+Fe NPs sample.

The ratio of Zn/Fe samples obtained by ICP and EDS for each sample is presented in Table S1. The Zn/Fe values are quite similar for Zn-Fe alloy and Zn-Fe NPs coatings, and it is expected to be higher for Zn NPs + Fe NPs since the coating is deposited on a centered line of 3 mm surrounded by only Zn NPs (see the real image of the Zn NPs + Fe NPs sample in Figure S2).

Table S1. Values of Zn/Fe ratios obtained by ICP and EDS.

Coating	Zn/Fe ratio	
	ICP-OES	EDS
ZnFe alloy	2.5	1.91
ZnNPs + FeNPs	34.14	10.12
ZnFe NPs	18.34	12.71

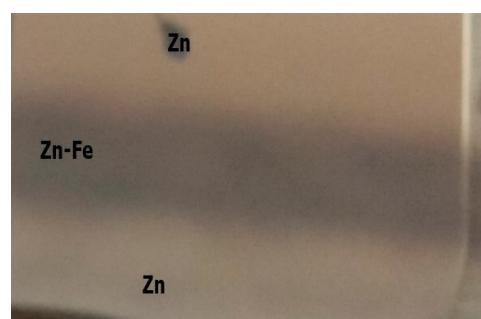


Figure S2. Real image of Zn NLs + Fe NPs coating.