Non innocent oxoanions encapsulated in Ferritin for SPECT imaging

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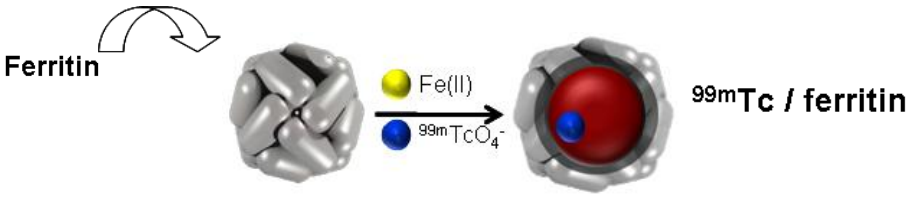
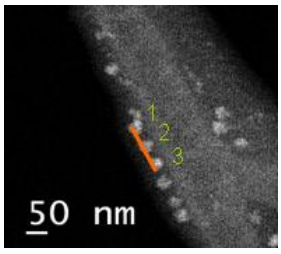
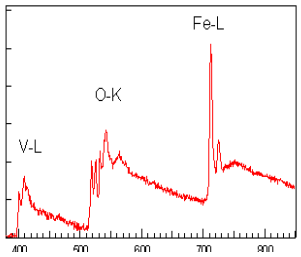
In the last years the preparation of nanostructured materials has attracted great interest. Considerable research efforts have been focused on the preparation of bifunctional metallic nanoparticles, it means particles having several different properties: magnetic, optical, electrical, radiactive or catalytical. This kind of particles has biomedical potential interest by itself and can be also used as precursors for the fabrication of technological devices, through controlled deposition following a bottom up approach.[1]
Experimental results concerning the synthesis of apoferritin-encapsulated particles containing the native ferrihydrite iron(III) mineral and different iron/oxo-anions, such as iron vanadate, iron phosphate, iron molibdate , iron arsenate or pertechnectate, and **HAADF-TEM, EELS**, characterization is presented. In the case, of the pertechnectate, the radionuclide encoded apoferritin nanoparticles can have a new potencial to be used for diagnosis and radiotherapy treatment of tumor cells, and for radioimmunotherapy and radioinmunodetection of differents cancers.



The ^{99m}Tc apoferritin encapsulation can be a useful tool to increase the therapeutic efficacy of a drug by increasing its circulation time, by decreasing its adverse side-effects and with appropriate functionalization by delivering it to regions of the body not normally accessible to the free drug. Ft/Tc nanoparticles supply a new modality for diagnosis (SPECT *S*ingle *P*hoton *E*mission *C*omputed *T*omography). The coelution of Tc and protein was an indication that **^{99m}Tc** was attached to apoferritin.
EELS, data of the vanadate/ferritin system show homogeneous particles with signals O (~532 eV), Fe (~708 ev) and V(~512eV), and a relation Fe/V= 2.30.
This represent a new approach for the incorporation of anion radiotracers for therapy and diagnosis.



HAADF for three consecutive particles



EEL spectra in the energy loss region

References: [1] Jinhao Gao, Hongwei Gu and Bing Xu *Acc. Chem. Res.*, **2009**, *42* (8), pp 1097–1107