Electronic Supplementary Material (ESI) for Materials Advances.
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Electronic Supplementary Information (ESI)

Ultra-small Platinum-based coordination nanoparticles for radiotherapy

Riya George,[*a] Lucile Fétiveau,[a] Erika Porcel,[*b] Farah Savina, [b] Charles Bosson, [b] Diana Dragoe, [a] Francois Brisset,[a] Hynd Remita, [c] Sandrine Lacombe, [b] and Laure Catala[*a]

Author address:

a. Université Paris-Saclay, CNRS, Institut de chimie moléculaire et des matériaux d'Orsay, 91405, Orsay, France.

b. Université Paris-Saclay, CNRS, Institut des Sciences Moléculaires d'Orsay, 91405, Orsay, France

c. Université Paris-Saclay, CNRS, Institut de Chimie Physique, 91405, Orsay, France.

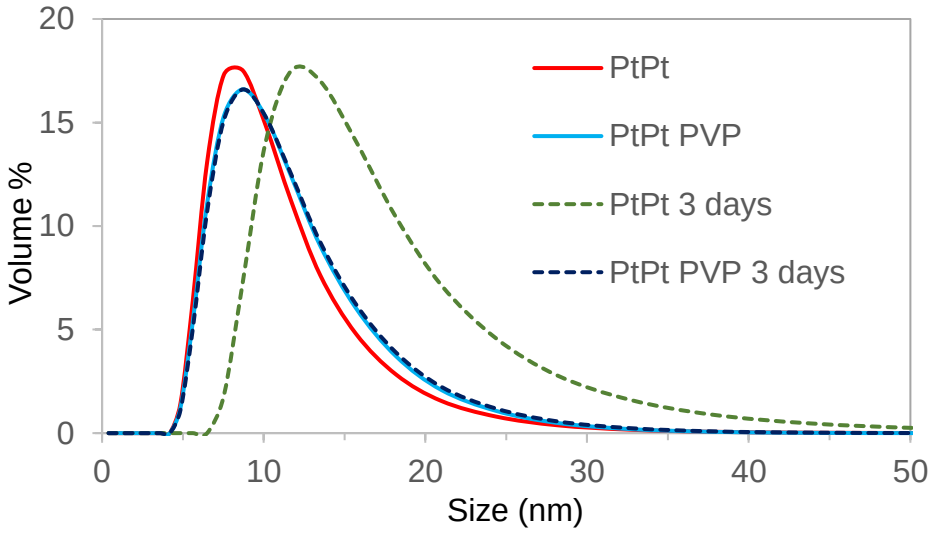

Figure 1. Hydrodynamic diameter of PtPt NPs before and after PVP addition and its evolution over 3 days (dotted lines)

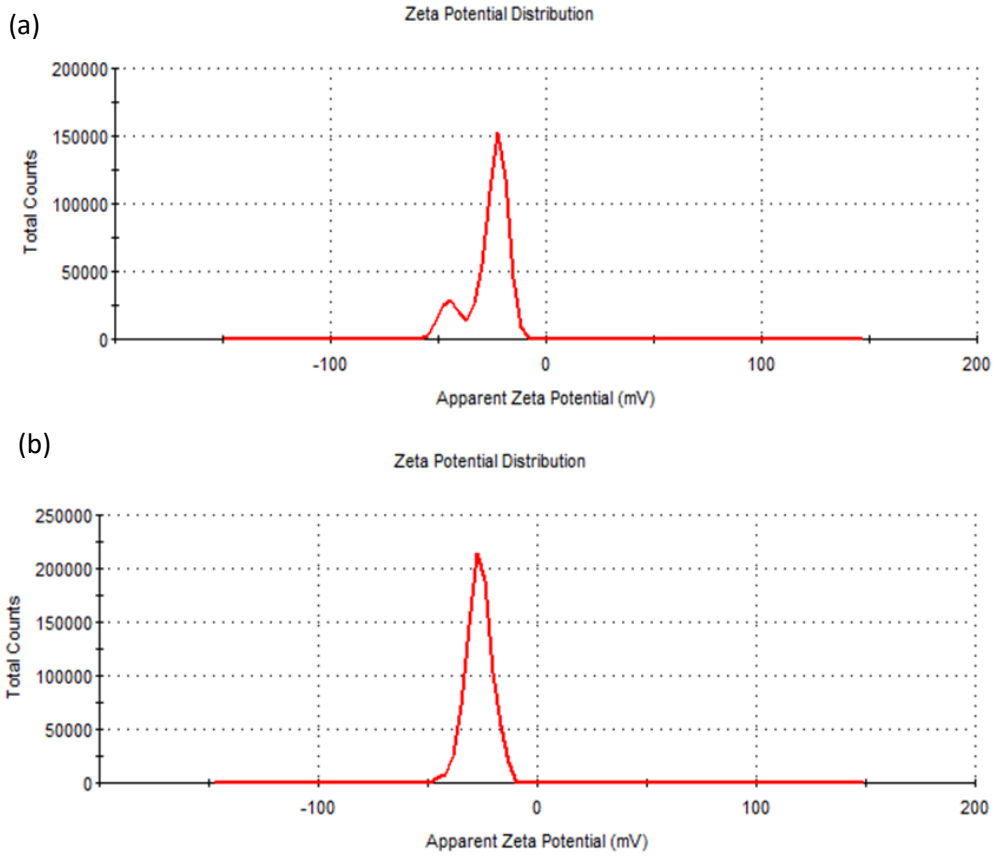

Figure 2. Zeta potential of (a) PtFe NP solution and (b) PtPt NP solution

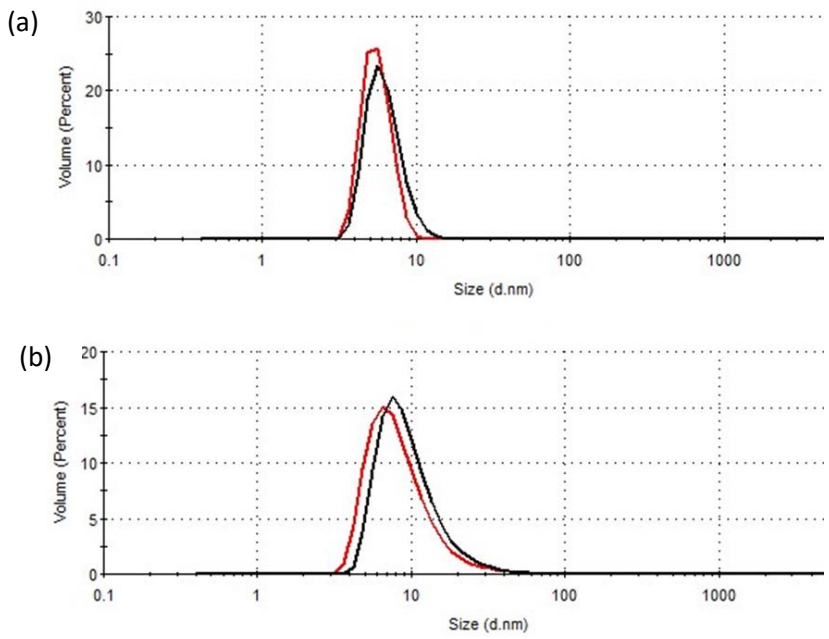

Figure 3. DLS results of (a) PtFe and (b) PtPt NPs in phosphate buffer solution (PBS). The red curve represents hydrodynamic diameter at 1 hr and the black curve corresponds to size after 19 hours in PBS

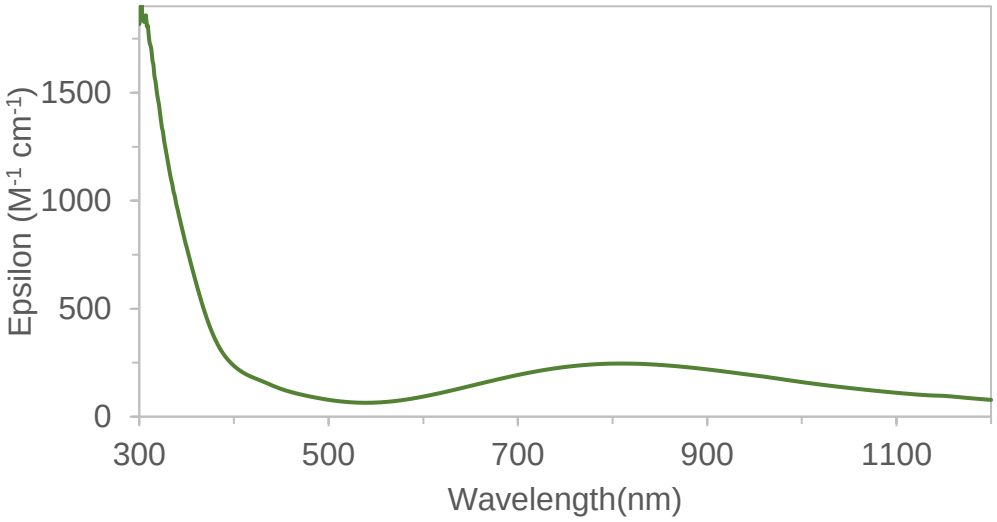

Figure 4. Absorption spectra of PtFe NP solution with Fe^{II}-CN-Pt^{II} and Fe^{II}-CN-Fe^{III} bands around 300 and 800 nm respectively

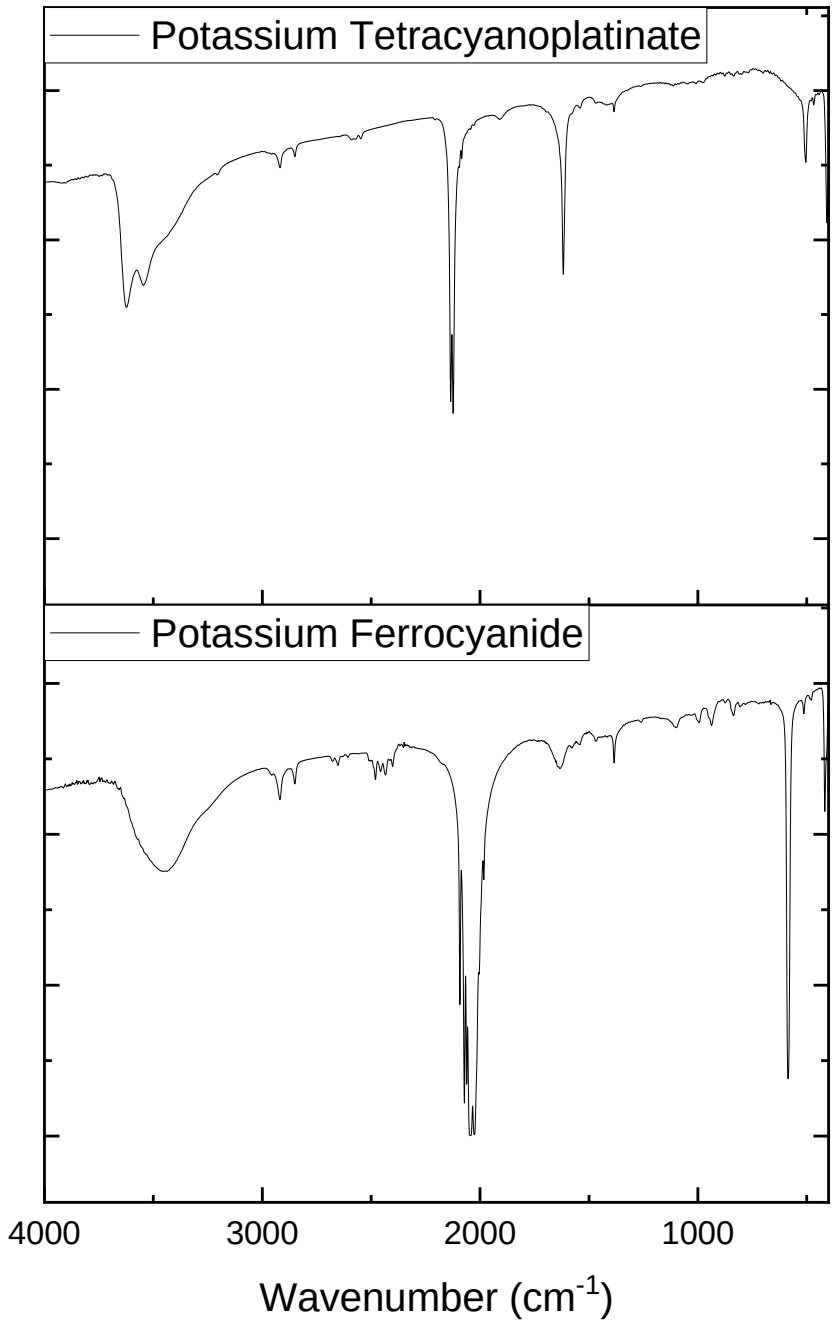

Figure 5. Infra-red spectra of Pt(II) and Fe(II) precursors used in the synthesis of PtFe and PtPt NPs

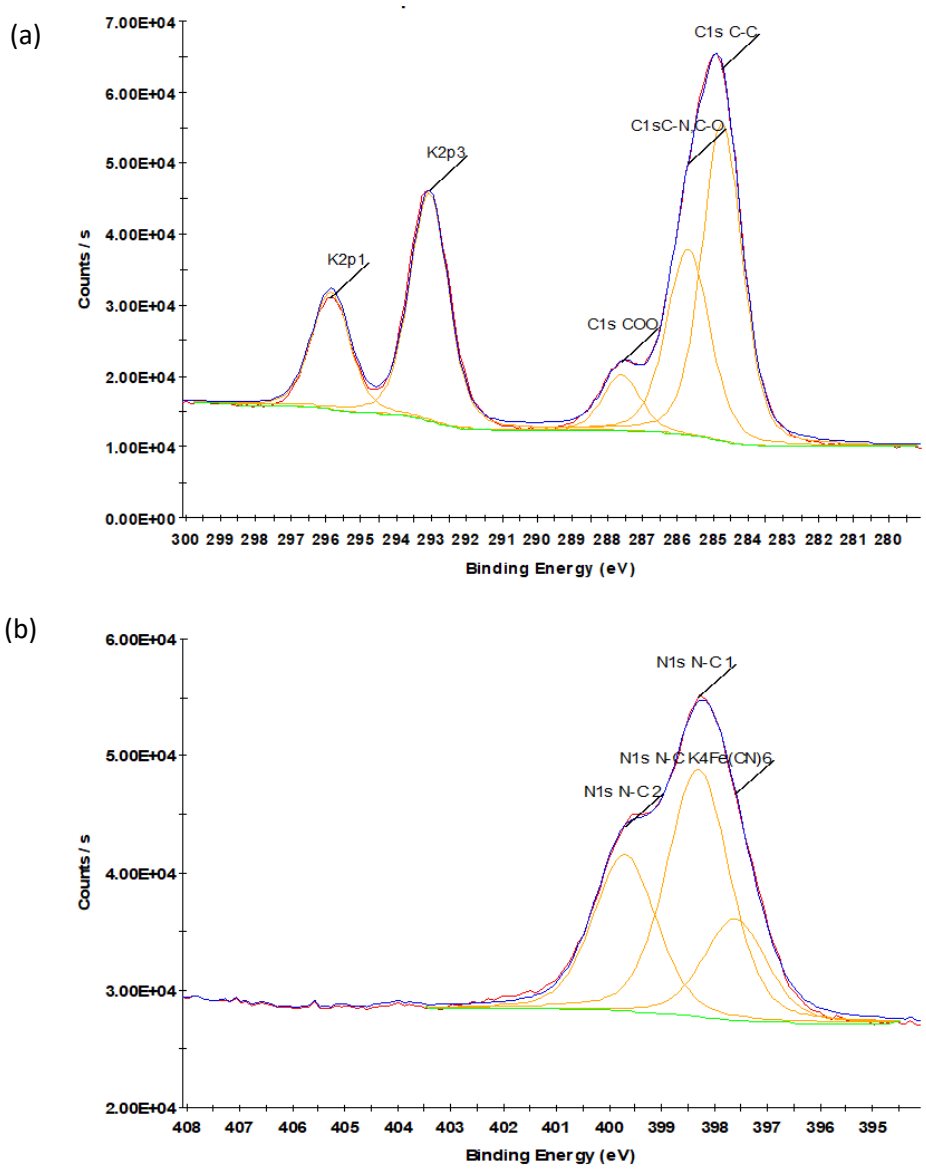

Figure 6. XPS spectra of PVP-coated PtFe NPs in regions (a) K-2p, C-1s and (b) N-1s with corresponding peaks assigned after deconvolution

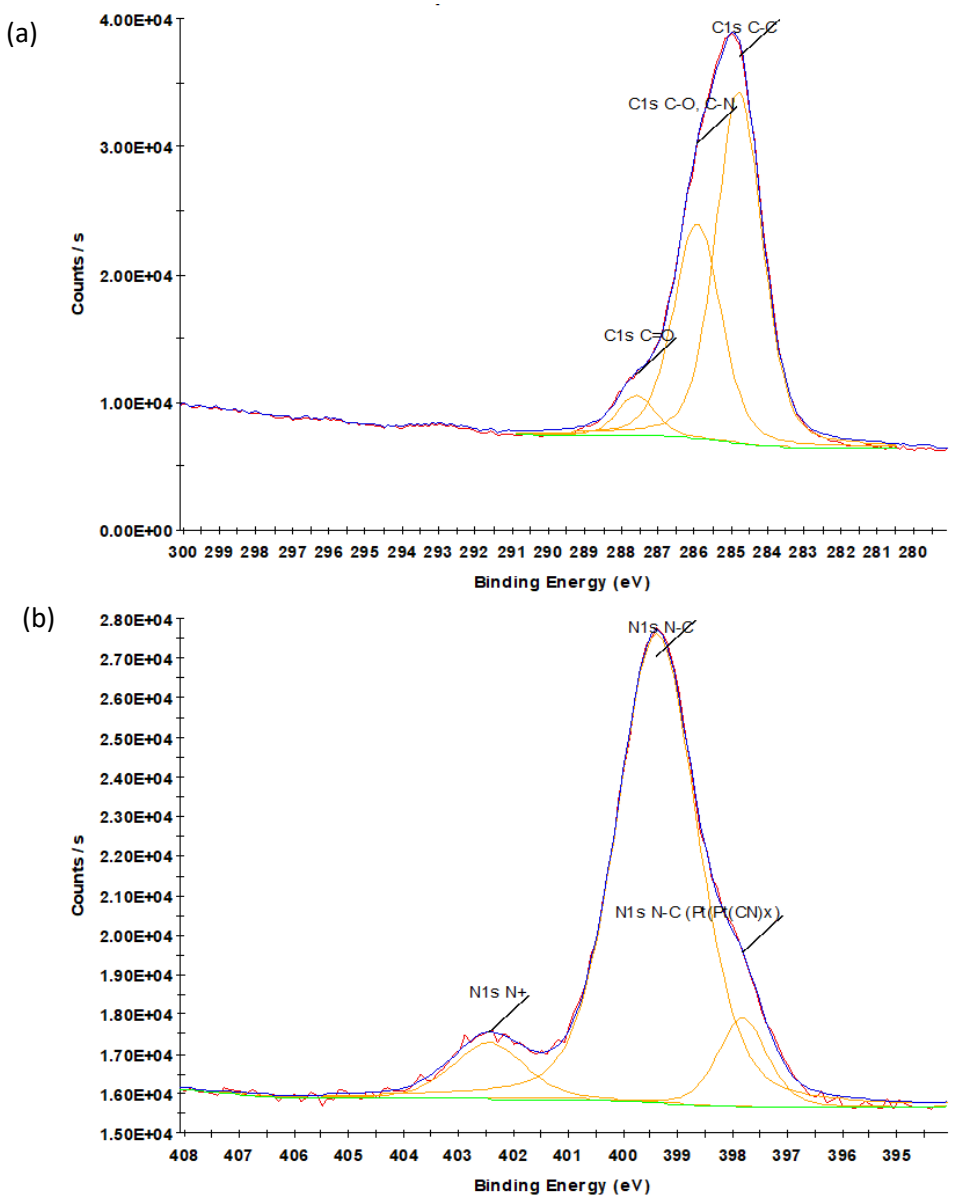

Figure 7. XPS spectra of PVP-coated PtPt NPs in regions (a) C-1s and (b) N-1s with corresponding peaks assigned after deconvolution. CTAB (5mM in methanol) was added to PtPt NP solution in order to induce flocculation and obtain a larger quantity of powdered sample for XPS studies and the N+ peak around 402.5 eV corresponds to this quaternary ammonium salt.

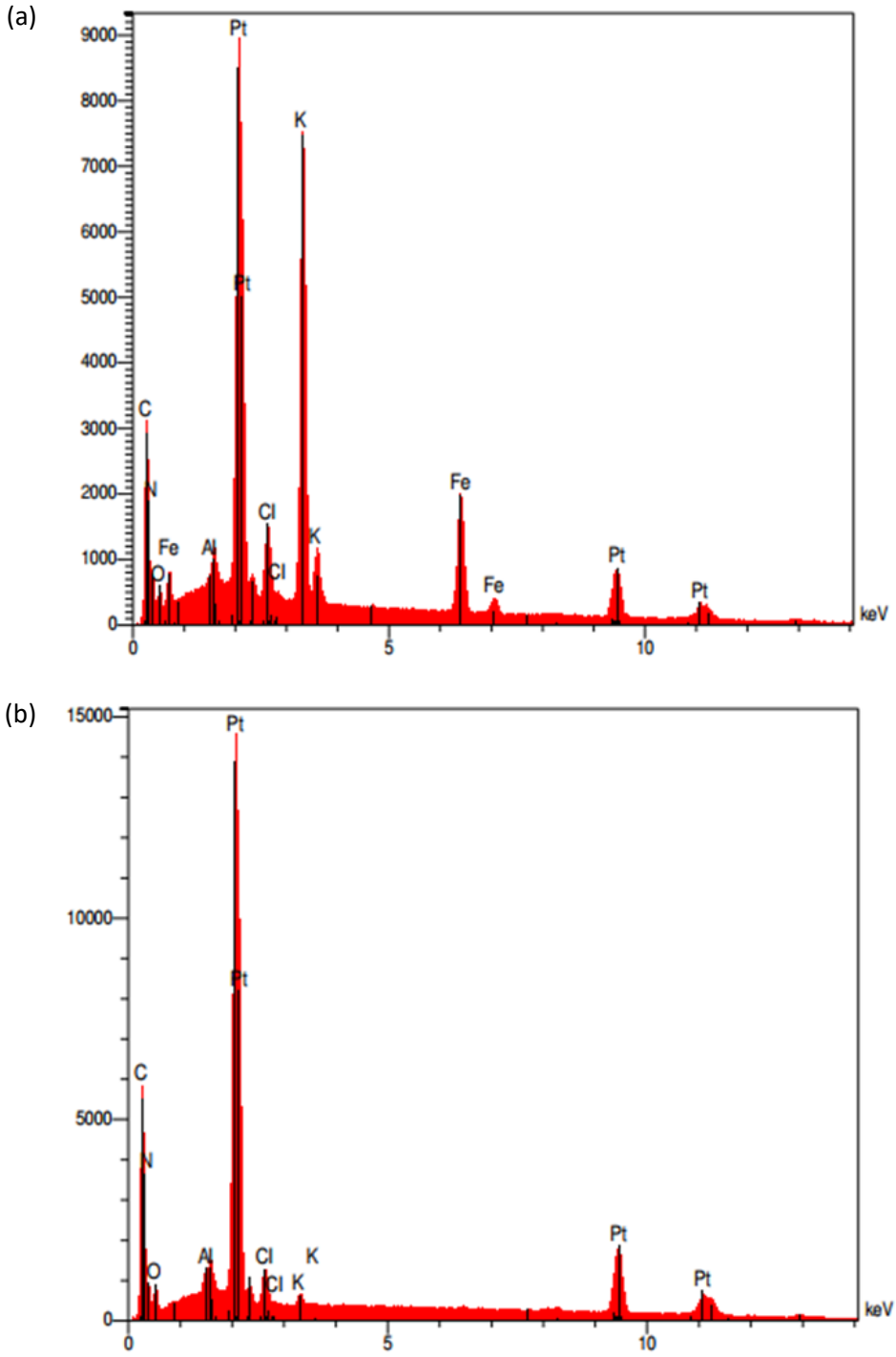

Figure 8. Energy dispersive spectra of (a) PtFe and (b) PtPt NP

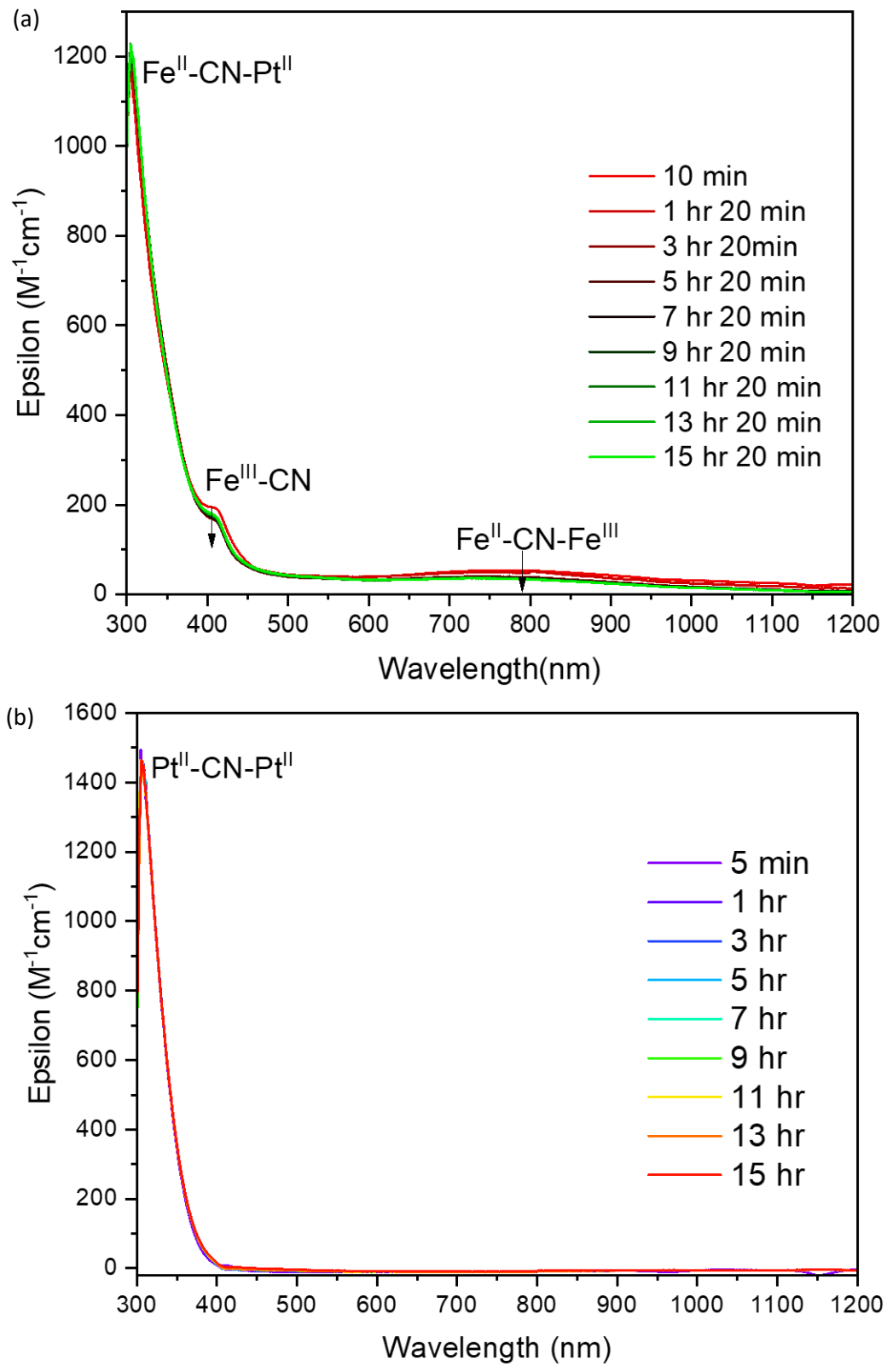

Figure 9. Evolution of (a) PtFe and (b) PtPt NPs in Fetal Bovine Serum (FBS)

Artificial lysosomal fluid (ALF) was prepared by mixing the reagents listed in Table 1 in deionized water (1L), according to Colombo et al.(1)

Table 1. Composition of artificial lysosomal fluid

Chemicals	Weight (g)
Sodium Chloride	3.21
Magnesium Chloride	0.05
Disodium hydrogen phosphate	0.071
Sodium sulphate	0.039
Calcium chloride dihydrate	0.128
Sodium citrate dihydrate	0.077
Glycine	0.059
Citric acid	20.8
Sodium hydroxide	6
Sodium tartrate	0.09
Sodium lactate	0.085
Sodium pyruvate	0.086
Final pH	4.5

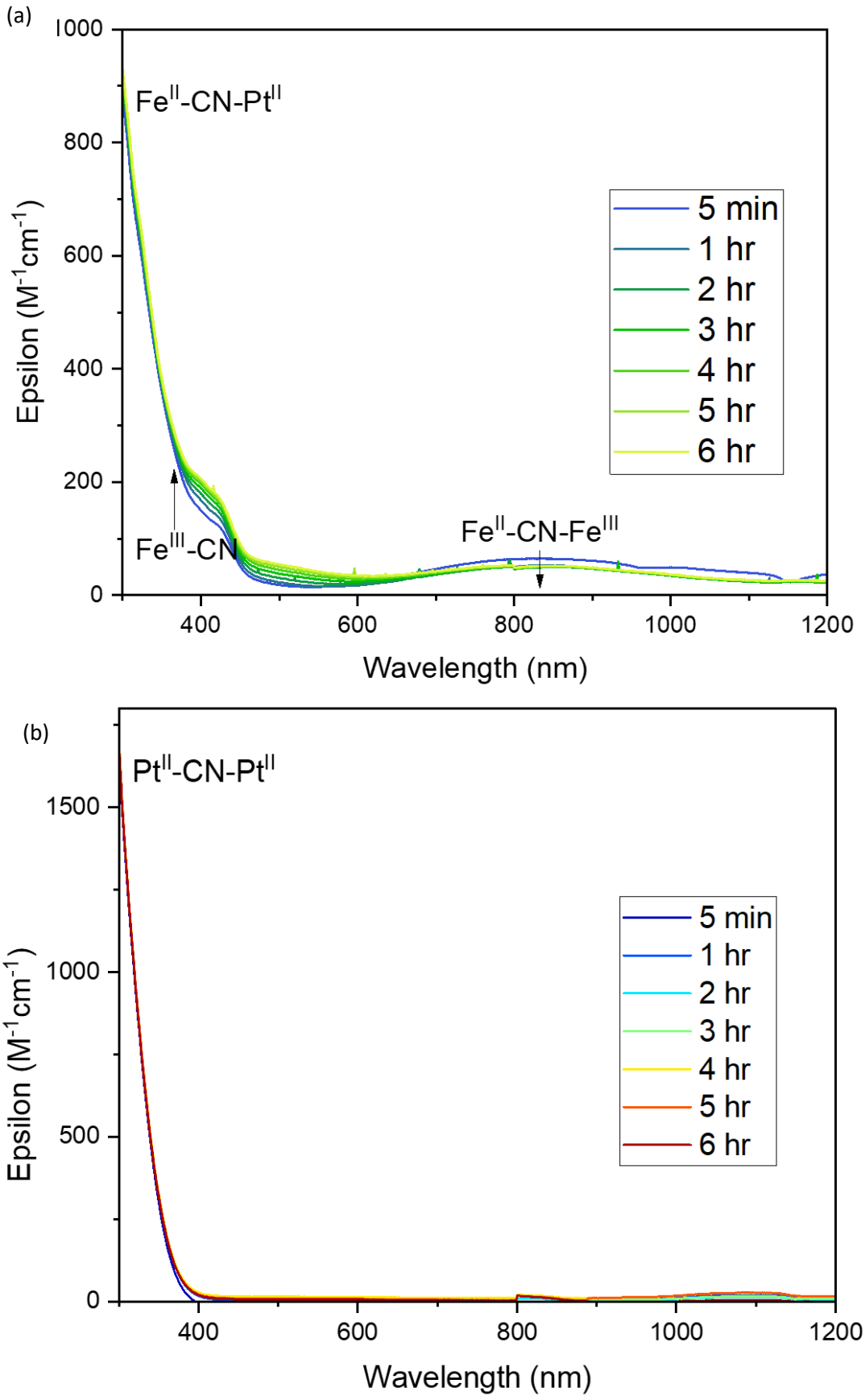

Figure 10. Evolution of (a) PtFe and (b) PtPt NPs in Artificial Lysosomal Fluid (ALF)

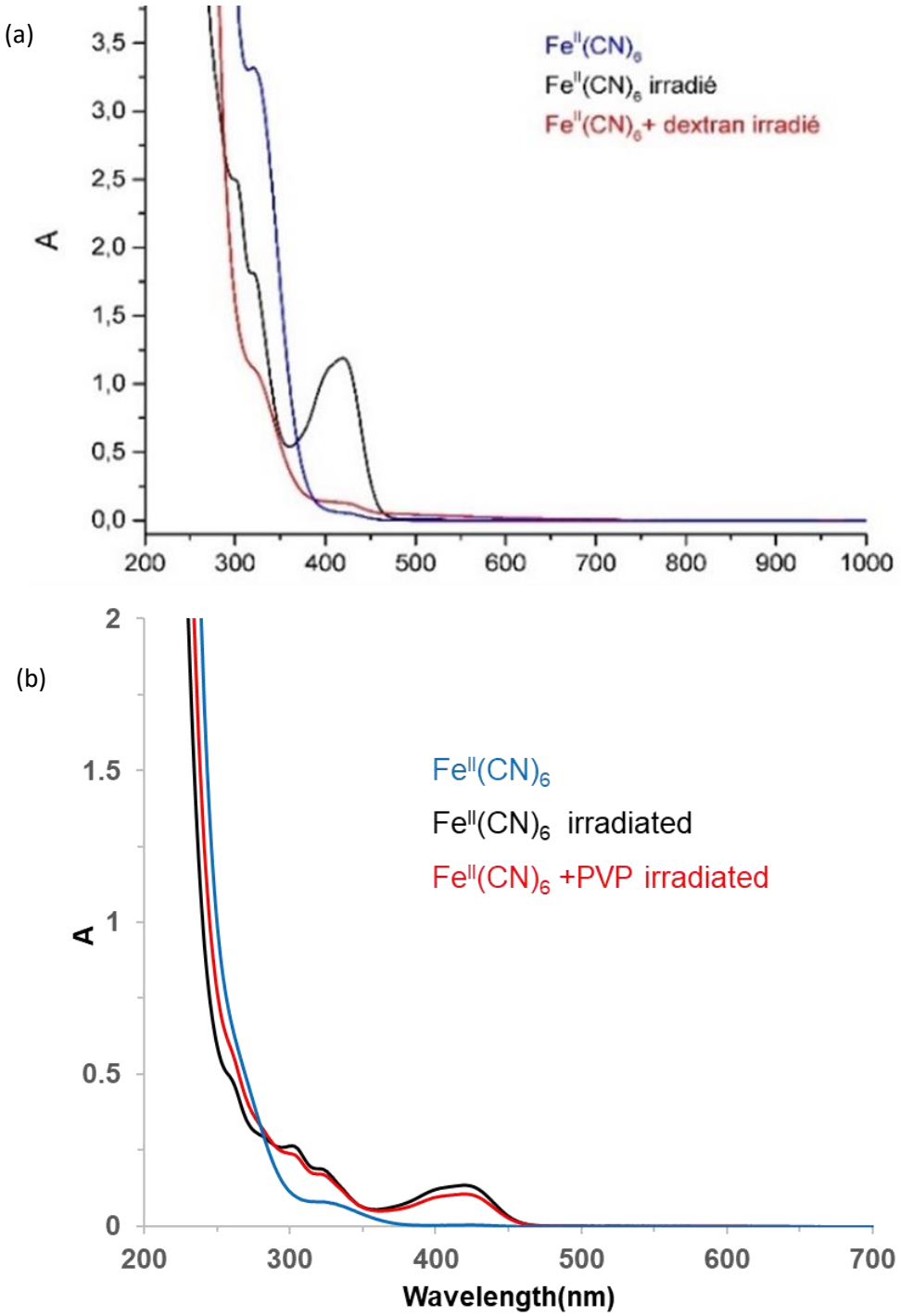

Figure 11. Absorption spectra of potassium ferrocyanide before and after irradiation in the presence of (a) dextran and (b) PVP polymer. The band at 425 nm corresponds to the oxidation of Fe^{II} to Fe^{III} in the presence of reactive oxygen species. The disappearance of this band in dextran's presence proves the polymer's radical scavenging nature. PVP does not affect the ferricyanide band, proving its suitability as a coating for radio-enhancer NPs.

References

(1) C. Colombo, A. J. Monhemius, J. A. Plant, *Ecotoxicology and Environmental Safety,* 2008, **71(3),** 722–730