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PGM nanoparticles and hybrid nanocomposites by gamma radiolysis/EISA

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The multi-functional Platinum Group Metals (PGMs) pure and hybrid nanostructures are based on a biomimicking approach. Marine organisms like diatoms and radiolaria provide material scientists with many examples microstructures are formed by biomineralization a templated self-assembly process in which pre-organized organic surfaces regulate the nucleation, growth, morphology and orientation of inorganic crystals. Recently, various synthetic pathways that mimic aspects of biomineralization have been explored to produce patterned ceramic materials, among which the so-called EISA and EISA templating processes. This research project focuses on the development of pure and hybrid advanced 1-, 2- and/or 3-dimensional PGMs nanocomposites for multi-functional technological applications by a versatile novel hybrid nanotechnology-nuclear process: Radiolysis and Evaporation Induced Self Assembly (EISA). Pt solution of different concentration was prepared from K_2PtCl_4. The effect of irradiation on Pt^{4+} solutions with different concentrations irradiated at a certain dose was shown. The big black particles that are fairly agglomerated were spotted when the concentration is above 5×10^{-3} M. The UV-Vis spectrum of Pt of different concentrations shows a strong absorption peak at the wavelength 261 nm after irradiation, which indicates the presence of platinum nanoparticles. Furthermore, XRD and HRTEM images also confirmed the presence of the nanoparticles produced by radiolysis.

Biography

Takalani Cele has received her MSc in Physical Science from University of the Western Cape, South Africa. She is currently pursuing PhD in Nanotechnology at University of South Africa. Her research interest is PGMs nanoparticles by radiolysis, jointly supported by iThemba Laboratory for Accelerator Based Science in South Africa and Université du Maine, Le Mans, France. She is also working on other projects in the Department of Trade and Industry in Innovation and Technology unit.

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