

# Visualizing Metabolic Changes in Probing Human Cancer Cells and Tissues Metabolism Using Vivo $^1\text{H}$ or Proton NMR, $^{13}\text{C}$ NMR, $^{15}\text{N}$ NMR and $^{31}\text{P}$ NMR Spectroscopy and Self-Organizing Maps under Synchrotron Radiation

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Received: November 13, 2017; Accepted: November 20, 2017; Published: November 22, 2017

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## Editorial

In the current study, visualizing metabolic changes in probing human cancer cells and tissues metabolism using vivo  $^1\text{H}$  or Proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation was investigated. Cadmium Oxide (CdO) based Nano membranes have received a growing interests to the separation and purification of human cancer cells and tissues [1–48]. Human cancer cells and tissues are most experimentally diagnosed nowadays using vivo  $^1\text{H}$  or proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation, a reaction between Cadmium Oxide (CdO) nanoparticles and human cancer cells and tissues, using vivo  $^1\text{H}$  or proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation [49–89]. Selective removal of human cancer cells and tissues in a selective Nano membrane reactor enables the human cancer cells and tissues diagnosis using vivo  $^1\text{H}$  or proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation [90–100]. Numerous methods have been proposed to deposit Cadmium Oxide (CdO) Nano films on porous supports. Among them, electroless plating is an autocatalytic electrochemical reaction that offers the flexibility to apply very thin, conformal and continuous coatings to a variety of porous or non-porous supports. In this editorial, Cadmium Oxide (CdO) Nano membranes by different contents of Gold (Au) nanoparticles were prepared by sequential electroless plating technique and were characterized by vivo  $^1\text{H}$  or proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation. The Cadmium Oxide (CdO) – Gold (Au) Nano membranes with different contents of Gold (Au) nanoparticles was subjected to different annealing conditions to promote diffusion and distribution of elements to form an alloy matrix. The obtained results revealed that increasing in annealing time enhances the homogeneity of alloy and lead to obtain a

totally uniform alloy after 36h annealing at 785°C which was confirmed by compositional profiles. In addition, altering the Gold (Au) nanoparticles content of the alloy changed the morphology and it seems to be intended to have a dendritic morphology by increasing in Gold (Au) nanoparticles content. The Human cancer cells and tissues permeation through the prepared membranes increased substantially with increasing the temperature, but the separation factor is slightly decreased.

Cadmium Oxide (CdO) nanoparticles is the best-known electrocatalysts for the cancer toxicity reduction reaction. This editorial relates to electroless autocatalytic plating of Cadmium Oxide (CdO) nanoparticles onto a Nano membrane for visualizing metabolic changes in probing human cancer cells and tissues metabolism using vivo  $^1\text{H}$  or Proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation. Cadmium Oxide (CdO) nanoparticles plating involves the deposition of a Cadmium Oxide (CdO) nanoparticles coating from an aqueous bath onto a substrate by a controlled cancer toxicity reduction reaction which is catalyzed by the metal being deposited or reduced. The catalytic activity of Cadmium Oxide (CdO) nanoparticles depends on the procedure used to prepare the electrocatalysts, the size of Cadmium Oxide (CdO) nanoparticles and the surface roughness of Nano membrane. Nano surfaces were catalytically active by immersion Nano membranes in Cadmium Oxide (CdO) nanoparticles solution. By pressing Cadmium Oxide (CdO) nanoparticles-coated Nano membrane on diffusion electrode layer new method suggested to visualize metabolic changes in probing human cancer cells and tissues metabolism using vivo  $^1\text{H}$  or Proton NMR,  $^{13}\text{C}$  NMR,  $^{15}\text{N}$  NMR and  $^{31}\text{P}$  NMR spectroscopy and self-organizing maps under synchrotron radiation. The mass of Cadmium Oxide (CdO) nanoparticles deposited and the Cadmium Oxide (CdO) nanoparticles surface area were mainly affected by the reactant concentration, the deposition time and the temperature. Cadmium

Oxide (CdO) nanoparticles loading of the optimum condition was 0.385 mg/cm<sup>2</sup>. The catalyst structure was characterized via vivo <sup>1</sup>H or proton NMR, <sup>13</sup>C NMR, <sup>15</sup>N NMR and <sup>31</sup>P NMR spectroscopy and self-organizing maps under synchrotron radiation. Biospectroscopic results showed that Cadmium Oxide (CdO) nanoparticles layer can be attached closely and firmly to Nano membrane. Furthermore, biospectroscopic results indicated that strong peak correspond to crystalline facet. The mean grain size of the Cadmium Oxide (CdO) nanoparticles was 110 (nm). The electrocatalytic activity of the catalysts toward cancer toxicity reduction reaction was investigated by means of Linear Sweep Voltammetry (LSV). The biospectroscopic results also illustrate that placing a Cadmium Oxide (CdO) nanoparticle monolayer on a Nano membrane is an attractive way of designing better cancer toxicity reduction electrocatalysts with very low Cadmium Oxide (CdO) nanoparticles contents for visualizing metabolic changes in probing human cancer cells and tissues metabolism using vivo <sup>1</sup>H or Proton NMR, <sup>13</sup>C NMR, <sup>15</sup>N NMR and <sup>31</sup>P NMR spectroscopy and self-organizing maps under synchrotron radiation.

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