

Interaction of organoselenium compound with gold nanoparticles and effect on their redox properties

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Selenium being a soft nucleophile shows a high affinity for gold nanoparticles (GNP). The binding interactions between the selenium atom and GNP can influence the physico-chemical properties of organoselenium compound, including their electron transfer ability. In the present talk, the influence of chemical structure of organoselenium compound, viz. i.e. a linear compound, (bis(2-ethanol)selenide) (SeEOH) and a cyclic compound, DL-trans-3,4-dihydroxy-1-selenolane (DHS) on their binding with GNP have been investigated. The binding with GNP of (25 nm) was characterized by UV-visible spectroscopy, dynamic light scattering (DLS), zeta (z) potential, transmission electron microscopy (TEM) and surface enhanced Raman spectroscopy (SERS). The study reveals that both the compounds binds GNP through selenium centre, they differ in their binding strength and orientation on the GNP surface. Pulse radiolysis studies suggested that both the compounds on reaction with the hydroxyl radical produced similar selenium centered dimer radical cations, but differ in the yield of selenoxide in the presence of GNP. These results indicate that GNP can be used to modulate the electron transfer ability of selenium compounds.