

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Gold nanoislands for sensitivity enhancement in organic and imaging mass spectrometries (LDIMS, keV- and MeV-SIMS) ARNAUD DELCORTE, OSCAR RESTREPO, ANEESH PRABHAKARAN, Institute of Condensed Matter and Nanosciences, Université catholique de Louvain, Belgium — Gold nanoparticles condensed on the surface of organic materials induce large ion yield enhancements in secondary ion mass spectrometry, using atomic projectiles. Here, we first show that the interest of surface metallization extends to MeV-SIMS and to UV laser desorption/ionization, in which the energy of the primary beam is deposited through the electronic subsystems (but not to keV-cluster-SIMS). For the three methods, gold nanoislands induce at least a ten-fold increase of the characteristic fragment and molecular ion yields, making surface metallization an interesting approach for imaging MS of organic surfaces. In the second part of this report, we discuss the underlying physics. For instance, using molecular dynamics simulations, we explain why 10 keV atomic projectiles interacting with metallized organic surfaces desorb more molecules, and why it is not the case with cluster projectiles such as C₆₀ and Au₄₀₀. For the other regimes of irradiation, arguments involving photon absorption and electronic effects are proposed.

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Date submitted: 24 Nov 2010

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