

Surface Mass Imaging Technique for Nano-Surface Analysis

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Time-of-flight secondary ion mass spectrometry (TOF-SIMS) imaging is a powerful technique for producing chemical images of small biomolecules (ex. metabolites, lipids, peptides) "as received" because of its high molecular specificity, high surface sensitivity, and submicron spatial resolution. In addition, matrix-assisted laser desorption and ionization time-of-flight (MALDI-TOF) imaging is an essential technique for producing chemical images of large biomolecules (ex. genes and proteins). For this talk, we will show that label-free mass imaging technique can be a platform technology for biomedical studies such as early detection/diagnostics, accurate histologic diagnosis, prediction of clinical outcome, stem cell therapy, biosensors, nanomedicine and drug screening [1-7].

References

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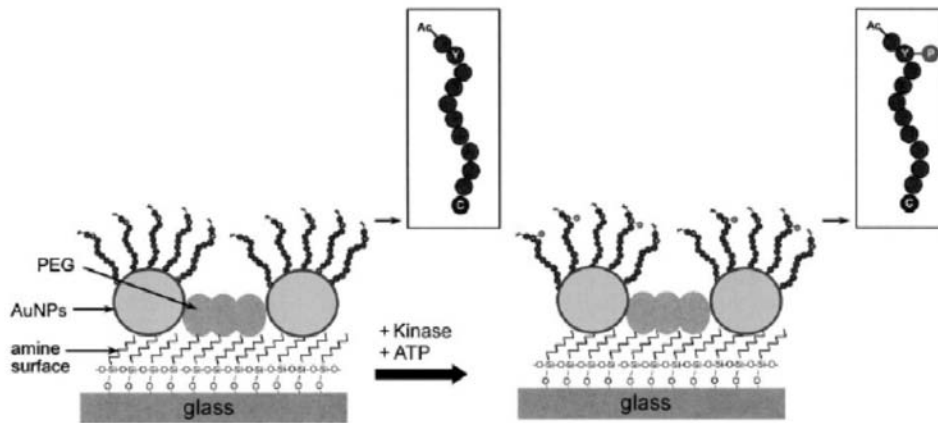


Figure 1. Schematic representation of the kinase assay by using SIMS on peptide-conjugated AuNPs on a glass surface. Y = tyrosine, (P): HPO_3^{2-} .

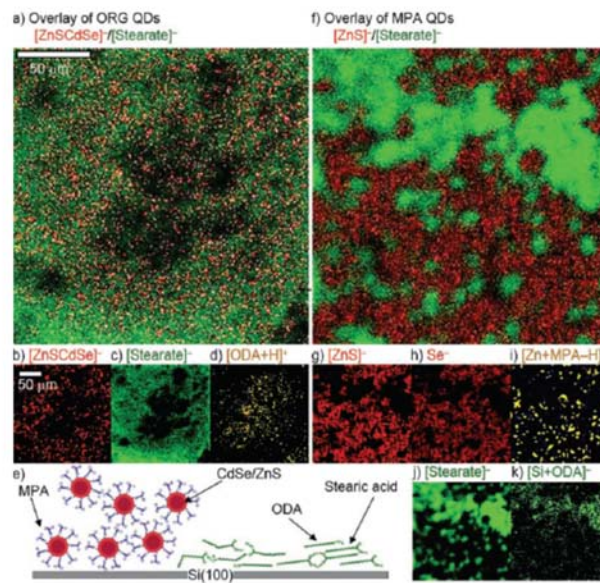


Figure 2. TOF-SIMS images of organic-soluble (ORG) (a-d) and MPA-capped water-soluble (MPA) nanocrystal quantum dots (QDs) (e-k); a) overlay of b) and c); b) $[\text{ZnSCdSe}]^-$; c) $[\text{stearate}]^-$; d) $[\text{ODA}+\text{H}]^+$; e) a schematic of MPA-capped nanocrystals on a Si substrate; f) overlay of g) and j); g) $[\text{ZnS}]^-$; h) Se^- ; i) $[\text{Zn}+\text{MPA}-\text{H}]^-$; j) $[\text{stearate}]^-$; k) $[\text{Si}+\text{ODA}]^-$.