Primary projectiles for biomolecular secondary ion mass spectrometry

Peter Williams

School of Molecular Sciences

Arizona State University

Tempe, AZ 85297, USA

Over the past 45 years, projectiles that have been used to eject intact biomolecular ions from surfaces for secondary ion mass spectrometry (SIMS) have ranged in energy from > 1 MeV/nucleon to < 1eV/nucleon, and in size from single atoms to clusters of tens of thousands of glycerol molecules. Surprisingly, there appears to be something of a common theme in the mechanisms of ejection (and molecular survival) involving these significantly different projectiles. This talk will present an overview of the issues involved in ejecting and ionizing intact biomolecular species for SIMS analysis, imaging and depth profiling. The mechanism of ionization in large molecule ejection remains a mystery but I will offer some speculations on this topic.