

## Induced Chemistry for Dissociative Electron Attachment to Focused Electron Beam Induced Deposition Precursors Based on Ti, Si and Fe Metal Elements

**Authors :** Maria Pintea, Nigel Mason

**Abstract :** Induced chemistry is one of the newest pathways in the nanotechnology field with applications in the focused electron beam induced processes for deposition of nm scale structures.  $\text{Si(OPr)}_4$  and  $\text{Ti(OEt)}_4$  are two of the precursors that have not been so extensively researched, though highly sought for semiconductor and medical applications fields, the two compounds make good candidates for FEBIP and are the subject of velocity slice map imaging analysis for deposition purposes, offering information on kinetic energies, fragmentation channels, and angular distributions. The velocity slice map imaging technique is a method used for the characterization of molecular dynamics of the molecule and the fragmentation channels as a result of induced chemistry. To support the gas-phase analysis, Meso-Bio-Nano simulations of irradiation dynamics studies are employed with final results on  $\text{Fe(CO)}_5$  deposited on various substrates. The software is capable of running large scale simulations for complex biomolecular, nano- and mesoscopic systems with applications to thermos-mechanical DNA damage, complex materials, gases, nanoparticles for cancer research and deposition applications for nanotechnology, using a large library of classical potentials, many-body force fields, molecular force fields involved in the classical molecular dynamics.

**Keywords :** focused electron beam induced deposition, FEBID, induced chemistry, molecular dynamics, velocity map slice imaging

**Conference Title :** ICMPA 2019 : International Conference on Molecular Physics and Astrophysics

**Conference Location :** Vienna, Austria

**Conference Dates :** December 26-27, 2019