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High and Ultrahigh Vacuum for Velocity Map Imaging of organometallic compounds

[1]M Pintea and [2]NJ Mason

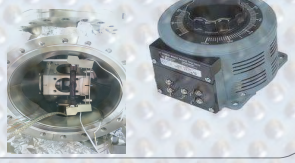
[1] School of Physical Sciences, The Open University, Milton Keynes, MK7 6AA, UK

[2] School of Physical Sciences, The Open University, Milton Keynes, MK7 6AA, UK; School of Physical Sciences, University of Kent, Canterbury, CT2 7NH, UK

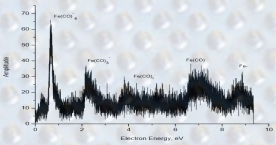
The Open University

The carried in the field of induced fragmentation of molecular compounds is using two of the most commonly known low electron energy applications, dissociative electron attachment and dissociative ionization. Breakage of ligands occurs to form metal cores out of parent molecules, releasing the gas contaminants for a clean deposition, known as FEBID (Focused Electron Induced Deposition), the method was perfected to grow high purity metal structures.
For the purpose of this research, two molecules have been studied up to present, Fe(CO)5 and W(CO)6 using Velocity Map Imaging technique offering insights into velocity distribution, kinetic energies and cross sections and angular distributions of the ions formed in the chemical fragmentation reactions.

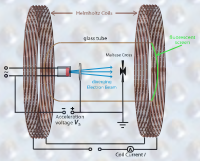
Quartz lamp for warming/baking of chamber



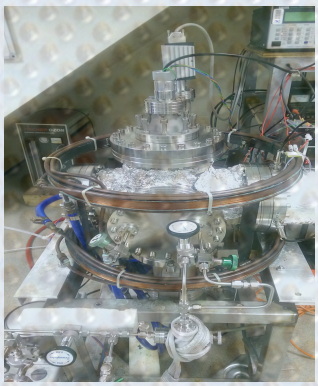
Ion Gauge with seeve for chamber pressure



Time- of - flight mass spectrometer and anneal curves for individual anion fragments



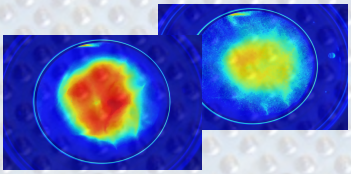
Helmholtz coils:
http://www.didaktik.physik.uni-muenchen.de/



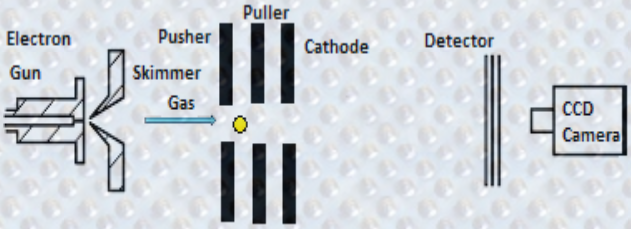
Electron Gun Function Generator

10-8 to 10-9 mBar by an oil-free SCROLLVAC SC5D with 6.4(3.8) m3/h

Rotary pump Leybold Edwards 3RV with 3.7 m3/h



CCD Camera:
Velocity Slice Map Output imaging



In the experimental set up, we use a ultrhigh vacuum chamber mounted with a 3 ring detector, a electron gun for negative ions production and a TOF mass spectrometer for molecular Analysis.
The vacuum is kept at levels of 10-8 to 10-9 mBar by an oil-free SCROLLVAC SC5D with 6.5(3.8) m3h.
The compounds are pumped through a Φ5mm diameter gas line using an inlet valve and a rotary pump Edwards 3RV with 3.7 m3/h. A CCD camera is mounted at the end of the phosphor screen for ion imaging. The acquisition is done using a LEEK software.

References

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