2nd Annual Meeting of COST Action CM 1301, CELINA

Chemistry for ELectron-Induced NAnofabrication

6th – 9th May, 2015, Bratislava, Slovakia

Book of Abstracts

Local Organizer: **Peter Papp** **(Comenius University in Bratislava, Slovakia)**

Action Chair: **Petra Swiderek** **(University of Bremen, Germany)**

Invited Lectures

STSM Reports

Topical Lectures

Electron impact dissociative ionization of tetraethyl orthosilicate

Jelena Maljković[1], Peter Papp[2], Michal Lacko[2], Michal Stano[2], Aleksandar Milosavljević[1], Stefan Matejcik[2]

(1) Laboratory for Atomic Collision Processes, Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

(2) Department of Experimental Physics, Faculty of Mathematics, Physics and Informatics, Comenius University, Mlynská dolina, 84248 Bratislava, Slovakia

e-mail: jelenam@ipb.ac.rs

We have investigated dissociative electron ionization of tetraethyl orthosilicate, TEOS ($Si(OC_2H_5)_4$), in gas phase, interesting as a possible Focused Electron Beam Induced Dissociation (FEBID) precursor. Measurements were performed at Comenius University on the crossed beams apparatus [1] and the cluster apparatus [2]. Both are equipped with trochoidal electron monohromator, which produces well collimated electron beam crossed perpendicularly with target. Positive ions formed with electron molecular interactions are extracted by a small electric field and recorded by quadrupole mass analyser. We have measured the possible pattern of fragmentation for TEOS molecule and compared with the NIST mass spectrum. Beside parent $M=(Si(OC_2H_5)_4)^+$ at m/z 208 many other positive ions were recorded in the mass spectrum, with many SiO_x^+ fragments (x= 2, 3 and 4) and their hydrogenated alternatives between m/z 60 and 100. Only the loss of 1 or 3 CH_3 or C_2H_5 was typical for TEOS, contrary to the loss of 1 or all 4 OC_2H_5 ligands. Alternative fragmentation paths were the loss of 2 CH_3 + CH_2CH_3; CH_3 + C_2H_5 + OC_2H_5; 2 C_2H_5 + OC_2H_5; CH_3 + 2 C_2H_5 + OC_2H_5. Beside that, measurements of threshold energies for all TEOS fragments have been done.

This work was supported by the Slovak Research and Development Agency under Contract No. APVV-0733-11; the Slovak grant agency VEGA V/0514/12; Ministry of Education and Science of Republic of Serbia (Project No. 171020). This work was conducted within the framework of the COST Action CM1301 (CELINA).

[1] M. Stano, S. Matejcik, J. D. Skalny and T. D. Märk, *Journal of Physics B: Atomic, Molecular and Optical Physics*, **36** (2003), 261

[2] O. Ingólfsson, F. Weik and E. Illenberger, *Int. Jour. Mass. Spec.* **155** (1996), 1