

Report on the outcomes of a Short-Term Scientific Mission¹

Action number: CA20129

Grantee name: Dr. Pamir Nag

Details of the STSM

Title: Electron-induced fluorescence of gas phase 1-propanol as a benchmark for electron-induced fluorescence in liquid micro-jets

Start and end date: 04/10/2023 to 13/10/2023

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

The STSM mission went as per the plan. I was able to see the setup and get myself familiarized with it. I also got the opportunity to see inside the vacuum chamber and perform some small repair work and replace some vacuum pumps. Then we carried out the at first some calibration experiments He and then performed the experiments with the planned sample, 1-propanol. We measured the electron induced fluorescence at 50, 70 and 100-eV incident electron energies. In addition, we also measured the cross section of the peaks produced due to -OH, -CH and -H fragments. The electron induced fluorescence spectra of 1-propanol for 50 eV incident electron energy is shown in Figure 1. And the differential cross section of the fluorescence spectra due to the CH fragment is shown in Figure 2.

¹ This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

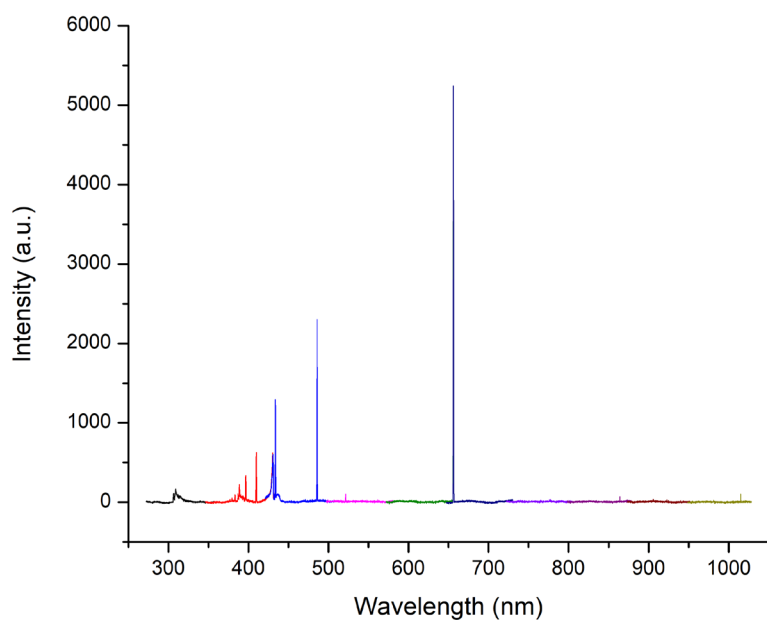


Figure 1: Electron induced fluorescence spectra of 1-propanol molecule measured at 50 eV incident electron energy.

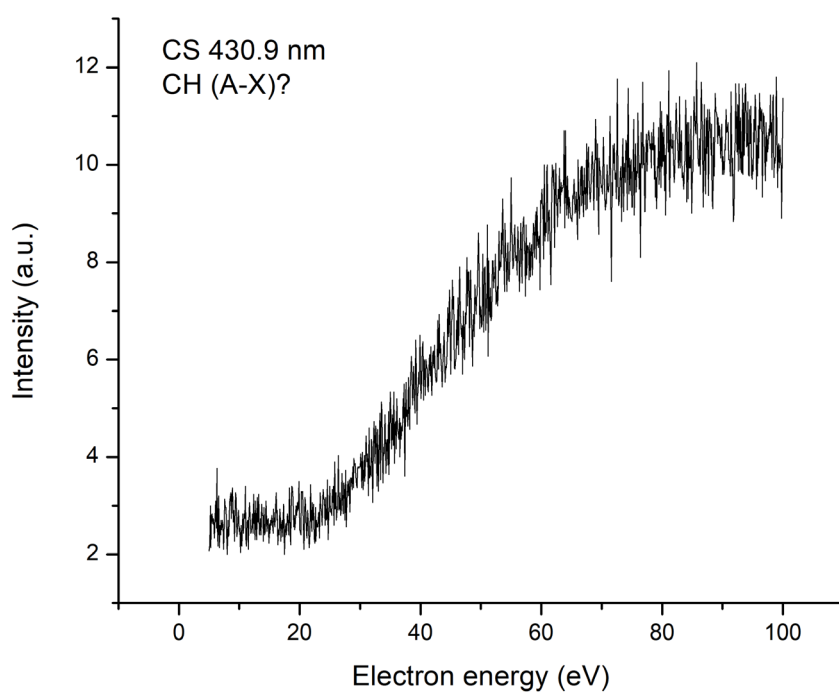


Figure 2: Cross section for the electron induced fluorescence spectra of the CH fragment of 1-propanol molecule.

Description of the STSM main achievements and planned follow-up activities

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

The mission was successful. We were able to perform all the planned experiments and got quality data. Next plan is to perform the detailed analysis of the measured data. We already started planning to start writing up a manuscript for publication solely based on the obtained data out of this STSM. The key points out of the mission are:

- 1) We obtained the benchmark data for electron induced fluorescence (EIF) measurement to 1-propanol in gas phase. This data will be used for the electron induced fluorescence (EIF) measurement with liquid microjet setup in Prague.
- 2) The obtained data will result into one joint publication. We already discussed about writing out the first draft of the manuscript. We believe this data will strengthen our understanding of electron beam induced chemistry in isolated molecule. This mission resulted data for MultiChem WG1 task T1.3 (atomistic-level investigation of electron-driven chemistry)
- 3) We discussed about the future joint collaborative research work. The Bratislava group agreed to bring their spectrometer to Prague for the measurement of electron induced fluorescence in liquid phase. We already decided the exact date for the mission and details about the planned mission to Prague during this year itself. The visit will result data for MultiChem WG1 task T1.2 (irradiation induced chemistry of complex biomolecular systems).
- 4) We also briefly discussed about writing some joint research grant in future. Further details will be plan in due time.