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Development of DEA instrumentation for a comprehensive understanding of gas-phase molecular fragmentation[1] SYLWIA PTASINSKA, ZHOU LI, ALEKSANDAR R. MILOSAVLJEVIC, IAN CARMICHAEL, University of Notre Dame — Electron attachment to a molecule triggers several dissociation pathways of transient molecular anions, each resulting in the formation of one negative ion and its counterpart. The counterpart can be a single neutral radical or several fragments. However, there are no studies that detect the neutrals formed from the dissociative electron attachment (DEA) process to molecules in the gas phase. In order to do this, we developed stepwise electron spectroscopy (SWES) [1]. We detected the neutrals produced upon DEA to CCl_4 at ˜0 eV by measuring the appearance energies of CCl_3 radical as well as the other neutral species. In addition, we combined the experimental findings with high-level quantum chemical calculations to obtain a complete analysis of both the DEA to CCl_4 and the subsequent electron-impact ionization of CCl_3radicals. The detection of neutral radicals can be essential from the point of view of radiation damage to DNA, particularly in the case of double strand breaks (DSBs) by low energy electrons [2]. [1] Z. Li et al., Phys. Rev. Lett. (2017) in press, [2] B. Boudaiffa et al., Science 287, 1658 (2000)

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