Abstract

This dissertation thesis is focused on the electron induced fluorescence and dissociative excitation of astrophysically relevant molecules such as $(CH_3)_2CO$, CO, CS_2, O_2 and N_2. The experiments were carried out on the Electron Induced Fluorescence Apparatus based at the Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava. The experimental apparatus is based on a crossed electron and molecular beams method. We present data in the form of emission spectra in the spectral region of 300 – 950 nm measured at electron energies ranging from 8.5 to 100 eV. The excitation-emission functions for selected transitions were measured as well and their threshold energies were determined. In the case of CO, O_2 and N_2 the measured results were calibrated to absolute values of cross-sections according to previous research. The experimental results were analysed, compared to previous publications and thoroughly discussed. Presented data is a valuable addition to the database of reference data relevant for astrophysics, as we bring a comprehensive study on the emission of these molecules induced by electron impact.

Keywords: electron induced fluorescence, excitation, emission spectrum, cross-section, $(CH_3)_2CO$, CO, CS_2, O_2, N_2