NOVEL APPLICATIONS OF SHAPE-SENSITIVE DETECTOR 3: MODELING COMBUSTION CHEMISTRY THROUGH ELECTRIC DISCHARGE SOURCE

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Chirped Pulse Fourier Transform Microwave Spectroscopy (CP-FTMW) was used to study combustion chemistry of 2,3-dihydrofuran. 2,3-Dihydrofuran is a prototypical system that we used to demonstrate CP-FTMW as a shape sensitive detection device. The combustion process was initiated by applying a voltage through an electric discharge nozzle. The microwave spectrum of 2,3-dihydrofuran has been taken to observe the products formed after discharge, simulating a combustion environment. The most prominent molecules formed were cyclopropanecarboxaldehyde and crotonaldehyde. These molecules were predicted to be found in our spectrum according to previous research[a]. Both of these molecules have cis and trans forms, in previous experiments others were not able to detect the different isomers but our setup allows us to distinguish between isomers. By analyzing the intensity information embedded in the rotational spectrum we are able to make semi-quantitative analysis on the relative concentrations of the different conformers in the spectrum.

[a] A. Lifshitz and M. Bidani*J. Phys. Chem.***93**(1139),1989.