TIME-RESOLVED ROTATIONAL SPECTROSCOPY OF CARBOXYLIC ACIDS. IDENTIFICATION AND QUAN-
TIFICATION OF THE COMPONENTS FROM HEATING ADIPIC ACID.

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Adipic acid (C₆H₁₀O₄), a linear dicarboxylic acid, is of great importance in industry as a precursor for the production
of nylon and as food additive (E355) to regulate the acidity of the product. Adipic acid is a stable compound at stan-
dard conditions; under heating it decarboxylates giving cyclopentanone as the main product and adipic anhydride as a
by-product. This behavior is contrary to other aliphatic dicarboxylics acids, which tend to produce the anhydride analogue
rather than the ketone. We investigated the self-reaction of adipic acid under heating employing high-resolution rotational
spectroscopy, which allows identifying each component in the gas phase, together with structure elucidation and quantifica-
tion of molecules. The microwave spectrum was measured using a segmented chirped-pulse Fourier transform microwave
(FTMW) spectrometer working in the 18-26 frequency range. The most intense lines were assigned to cyclopentanone,
but we were able to identify also two conformations of the adipic anhydride, one conformation of adipic acid, and even a
complex between cyclopentanone and one water molecule. We have analyzed the spectrum in time segments of one hour
each to investigate the reaction pathways of adipic acid and the temporal evolution of the components of the spectrum.