# $^{14}$N NUCLEAR QUADRUPOLE HYPERFINE STRUCTURE AND LARGE AMPLITUDE MOTIONS IN 2-METHYL-2-IMIDAZOLINE STUDIED BY ROTATIONAL SPECTROSCOPY

KATEŘINA LUKOVÁ, LUCIE KOLESNIKOVÁ, KAREL VÁVRA, PATRIK KANIA, RADIM NESVADBA, *Department of Analytical Chemistry, Institute of Chemical Technology, Prague, Czech Republic*; JAN KOUCKÝ, *Analytical Chemistry, Institute of Chemical Technology, Prague, Praha 6, Czech Republic*; ZBIGNIEW KISIEL, *ON2, Institute of Physics, Polish Academy of Sciences, Warszawa, Poland*; STEPAN URBAN, *Department of Analytical Chemistry, Institute of Chemical Technology, Prague, Czech Republic*.

2-methyl-2-imidazoline, also known as lysidine, is a non-planar heterocyclic molecule containing two $^{14}$N quadrupolar nuclei and one methyl group. The rotational spectra of this molecule were recorded in the frequency range from 7 to 20 GHz using a pulsed molecular jet Fourier transform microwave spectrometer[a] and in selected frequency regions between 90 and 220 GHz using two different millimetre-wave spectrometers[bc]. Lysidine displays a very rich millimetre wave spectrum presumably attributable to the presence of two large amplitude motions in the molecule: an internal rotation of the methyl group and a ring-puckering motion. The decimetre-wave spectra are even more complex as the hyperfine structure arising from the nuclear quadrupole coupling interactions of two $^{14}$N nuclei is also resolved. The first analysis of this challenging spectrum guided by quantum chemical calculations is reported in the present contribution.

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[c] Z. Kisiel, A. Kraśnicki, *J. Mol. Spectrosc.*, 262, (2010), 82–88.