CHARACTERIZATION OF STRUCTURAL ISOMERS OF NAPHTHALENE: ELECTRONIC SPECTROSCOPY OF Z-PHENYLVINYLACETYLENE

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In a variety of contexts from planetary atmospheres to combustion processes, the appearance of $C_{10}H_8$ is commonly attributed to naphthalene. Often neglected are other stable $C_{10}H_8$ isomers that could be formed prior to isomerization to naphthalene, such as phenylvinylacetylene (PVA, 1-phenyl-1-buten-3-yne). The electronic spectroscopy of the E isomer of PVA has already been reported,[b] but direct isomerization to naphthalene would seem more likely from the Z isomer. Here, we report the jet-cooled laser induced fluorescence and single vibronic level dispersed fluorescence spectra of Z-PVA. The spectra display low frequency vibronic structure reminiscent of that in styrene, attributable to the out-of-plane torsion and bend of the vinylacetylene group. The vibrational assignments are assisted by *ab initio* calculations and the results are compared with the analogous motions in styrene. Interestingly, the excitation spectrum shows a dramatic decrease in fluorescence intensity about 600 cm^{-1}above the electronic origin. This intensity drop off is attributable to a turn on in nonradiative processes.

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