

MICROWAVE SPECTROSCOPY OF TWO ISOELECTRONIC RADICALS:

2,4,6-HEPTATRIYNYL, $\text{H}_2\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{H}$, AND 2,4-HEXADIYNYLNITRILE, $\text{H}_2\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{N}$

WEI CHEN, *Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138; and Division of Engineering and Applied Sciences, Harvard University, Cambridge, MA 02138; and Department of Chemistry, Wesleyan University, Middletown, CT 06459*; STEWART E. NOVICK, *Department of Chemistry, Wesleyan University, Middletown, CT 06459*; M. C. McCARTHY, P. THADDEUS, *Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138; and Division of Engineering and Applied Sciences, Harvard University, Cambridge, MA 02138.*

The isoelectronic pair of radicals 2,4,6-heptatriynyl, $\text{H}_2\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{H}$, and 2,4-hexadiynynitrile, $\text{H}_2\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{C}\equiv\text{N}$, were produced in a pulsed discharge supersonic jet and detected by Fourier transform microwave spectroscopy. Seven rotational transitions of the heptatriynyl radical from $N' = 4$ to 10 and six rotational transitions of the hexadiynynitrile radical from $N' = 4$ to 9 in the $K_a = 0$ ladder were observed between 6 and 17 GHz. For each species, over 50 hyperfine components were measured and assigned with an uncertainty of 5 kHz. Precise rotational, centrifugal distortion, spin-rotation, and various hyperfine coupling constants were determined for both $\text{H}_2\text{C}_7\text{H}$ and $\text{H}_2\text{C}_6\text{N}$.