PULSED-FIELD IONIZATION ELECTRON SPECTROSCOPY OF COPPER-PYRAZINE, -PYRIMIDINE, AND -PYRIDAZINE COMPLEXES

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The copper complexes of pyrazine (1,4-$C_4H_4N_2$), pyrimidine (1,3-$C_4H_4N_2$), and pyridazine (1,2-$C_4H_4N_2$) are produced in laser-vaporization supersonic molecular beams and studied with pulsed field ionization zero electron kinetic energy spectroscopy and *ab initio* calculations. Adiabatic ionization energies of Cu-pyrazine, -pyrimidine and -pyridazine are measured to be 46038(7), 45332(7) and 43054(6) cm^{-1}, respectively. The metal-ligand stretching frequencies of Cu^+/Cu-pyrazine, -pyrimidine, and -pyrazine are 265/190, 270/189, and 273/192 cm^{-1}, and the metal-ligand bending frequencies of these complexes are 115/74, 161/151, and 131/123 cm^{-1}, respectively. In addition, a symmetric ring stretch of 906 cm^{-1} is observed for the Cu^+-pyrazine ion. In all three complexes, Cu binds with one nitrogen atom and is located in the same plane as the ligand ring.