ELECTRON SPIN RESONANCE INVESTIGATION OF MASS-SELECTED, MATRIX ISOLATED RADICAL CATIONS

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Small mass-selected, radical cations were matrix isolated and investigated by ESR spectroscopy. Ions produced by electron bombardment were mass-selected in a quadrupole filter and co-deposited with neon on a 4 K copper surface. The unit resolution of the quadrupole mass filter enabled distinction of adjacent ions in the mass spectrum. Collisional fragmentation of selected ions was minimized by low ion energies (15-30 eV). Ion beam current ranged from 0.2 nA to 2 nA. During deposition, the matrix was neutralized by an electron beam perpendicular to the ion flow. Because positive and negative species were trapped in separate matrix sites, matrix neutrality was maintained without total cation elimination. Systems studied include various boron hydride cations, hydrocarbon cations of astrophysical interest, and the first observation of matrix isolated $^{16}O^{+}$ and $^{17}O^{+}$.