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## SELECTIVE ATTENUATION OF ISOBARIC INTERFERENCES IN QUADRUPOLE ION TRAP MASS SPECTROMETRY

Glen P. Jackson,<sup>a,b</sup> Fred L. King<sup>a</sup> and Douglas C. Duckworth<sup>b</sup>

<sup>a</sup>Dept. of Chemistry, West Virginia University, Morgantown, WV 26506-6045

<sup>b</sup>Chemical Sciences Division, Oak Ridge National Laboratory,  
P.O. Box 2008, Oak Ridge, TN 37831-6375

Evidence is provided that Collision-Induced Dissociation (CID) in Quadrupole Ion Traps (QIT) can be used as a universal approach for the removal of polyatomic interferences in plasma-source mass spectrometry. Using neon as the collision (bath) gas and a high amplitude trapping potential ( $q_z = 0.67$ ) it is found that the CID rate for strongly bound diatomic molecules at a given  $m/z$  is considerably faster than the scattering rate for an atomic ion at the same nominal mass. This selective attenuation is also achieved during the acquisition scan ramp, alleviating the need for element specific resonance excitation frequency tuning and providing a simple approach to performing CID over a broad  $m/z$  range.

Selective attenuations using supplementary rf voltages are performed using a number of different approaches. A single-frequency excitation voltage in a fixed-amplitude trapping potential attenuated the very strongly bound diatomic ion  $^{181}\text{Ta}^{16}\text{O}^+$  (BDE  $\sim 760$  kJ mol<sup>-1</sup>) in the presence of  $^{197}\text{Au}^+$ . This exemplifies the high internal temperatures accessible using neon as the collision gas. A single frequency excitation amplitude with a variable trapping potential dissociated all isotopes of gadolinium oxide ( $^{154}\text{Gd}^{16}\text{O}^+$  and  $^{155}\text{Gd}^{16}\text{O}^+$ ) in the presence of  $^{170}\text{Yb}^+$  and  $^{171}\text{Yb}^+$ . The remaining isotopes of  $\text{Yb}^+$  verified that the  $^{170}\text{Yb}$  and  $^{171}\text{Yb}$  isotopes did not scatter during the dissociation of the interfering oxides. A broad band of excitation frequencies was used to dissociate dimers of copper that interfere with the isotopes of  $\text{Te}^+$  at  $m/z = 126, 128, \text{ and } 130$ . The uninterfered isotopes of  $\text{Te}^+$  again being used to verify that scattering did not occur. A range of masses could thereby be simultaneously dissociated, and recaptured, enabling the quantitative recovery of the  $\text{Te}^+$  ions as well as the  $\text{Cu}^+$  products. Finally, the simultaneous application of a resonance excitation frequency and axial modulation frequency during the acquisition ramp successfully dissociated diatomic ions while the mass spectrum was being acquired. This final approach holds promise as a means of providing a purely atomic mass spectra with full retention of atomic ions.

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