

## SUPPORTING INFORMATION

### **Spectroscopic Investigation of H Atom Transfer in a Gas-phase Dissociation Reaction: McLafferty Rearrangement of Model Gas-phase Peptide Ions**

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Figure S1. Tandem mass spectra for the dissociation of (a) (BetGOtBu)<sup>+</sup> and (b) (BetGOH)<sup>+</sup> generated using multiple-stage CID in the quadrupole ion trap mass spectrometer.

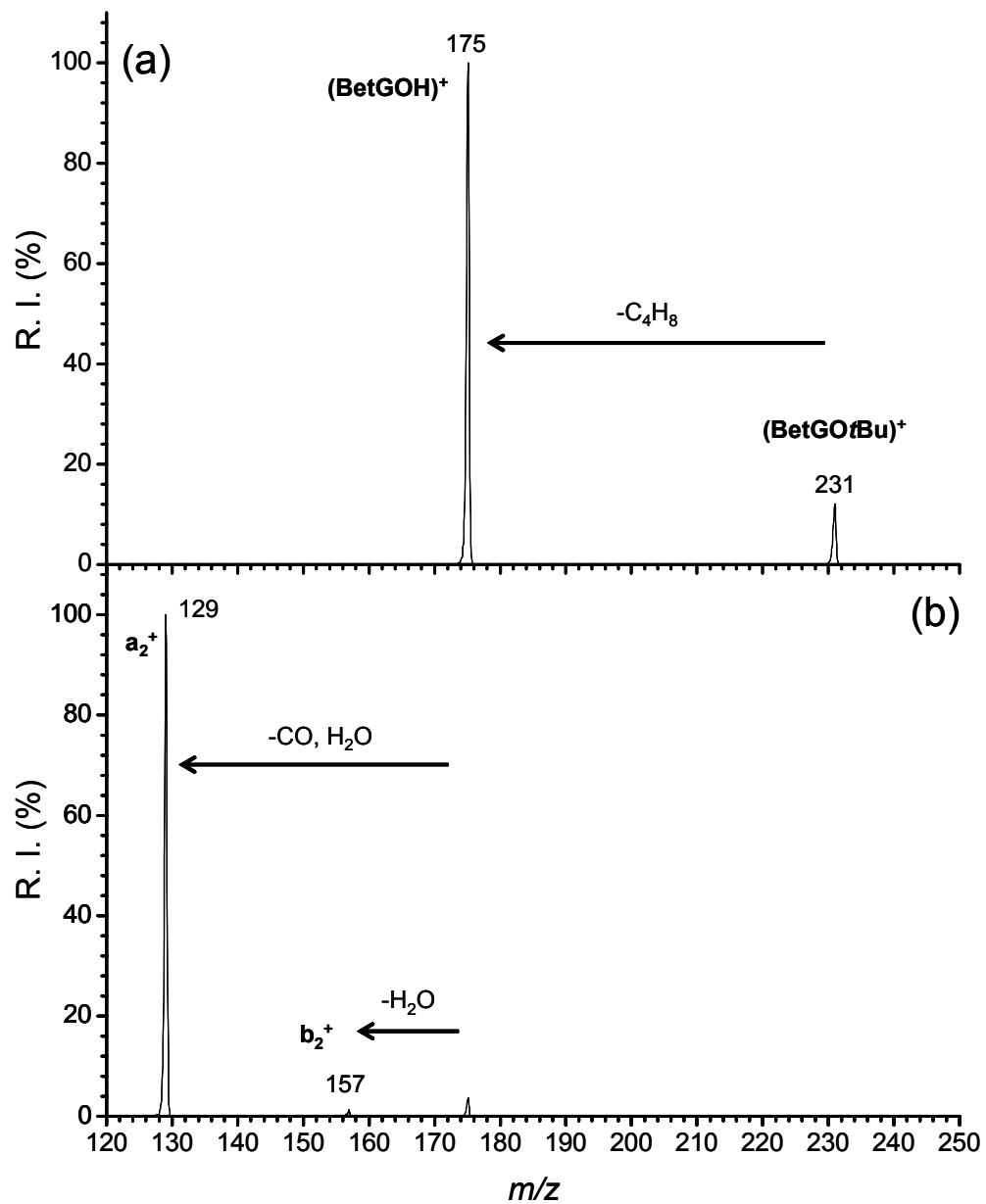


Figure S2. Tandem mass spectra generated from fully deuterium-exchanged betaine-glycine-*tert*-butyl ester using the quadrupole ion trap mass spectrometer: (a) dissociation of  $(M)^+$ ,  $d_1$ -BetGOtBu; (b) dissociation ( $MS^3$  stage) of  $(M)^+$ ,  $d_1$ -(BetGOH) $^+$ , product resulting from McLafferty rearrangement.

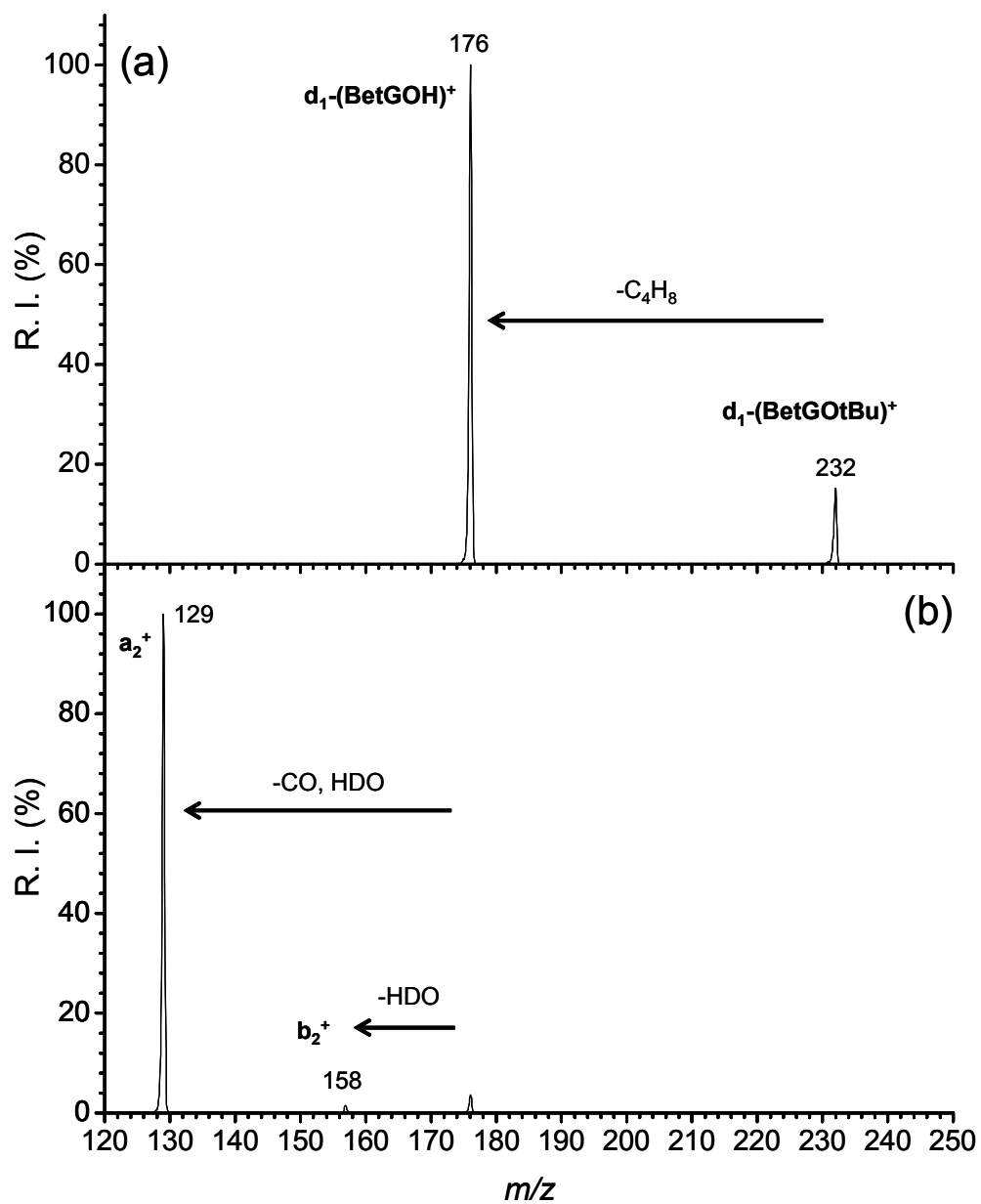


Figure S3. Comparison between IRMPD spectrum generated from (NicGGOH+H)<sup>+</sup> (a) and theoretical spectra based on DFT calculations for structures (b) Nic\_e, (c) Nic\_f, (d) Nic\_g, (e) Nic\_h and (f) Nic\_i. Conformations of the respective isomers are provided in figure 4 of the manuscript.

