Figure S1. Recorded mass spectrum of AlkC3 (black bars) at the lowest extent of fragmentation of the molecular ion at m/z= 106 (E/N = 78 Td) in the H_3O^+ ionization mode. The green thin line represents the expected molecular ion of the analyte and the intense signals depicted by the red thin bars represent the matrix analytes at m/z = 30 (NO^+) and 46 (NO_2^+) and their isotopic abundance signals at m/z = 31 and 47, 48 respectively. The signals corresponding to the water clusters ($H_3O^+(H_2O)_n$ at m/z 37 and 55 are systematically erased for simplification.
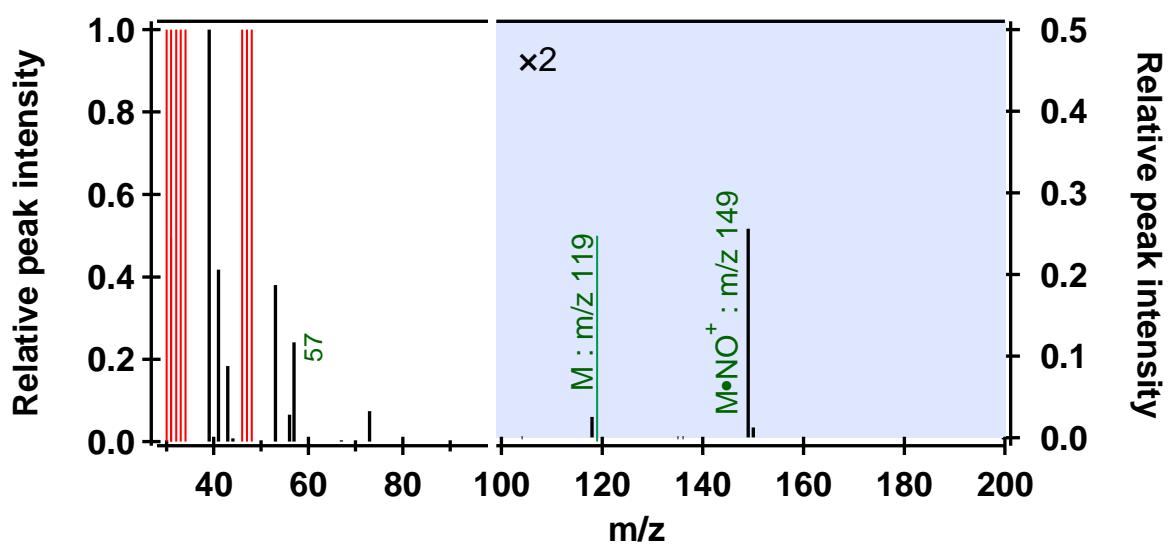
Figure S2. Recorded mass spectra of AlkiC4 (black bars) at the lowest extent of fragmentation (E/N* = 34 Td) in the NO+ ionization mode.
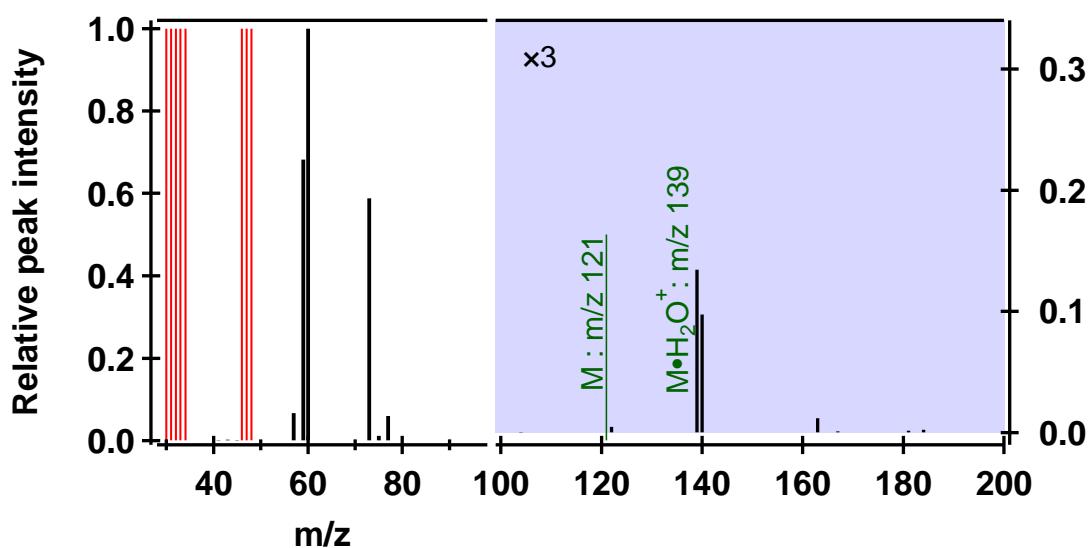
Figure S3. Recorded mass spectrum of 1OH3C3 (black bars) at the lowest extent of fragmentation (E/N = 62 Td) in the H_3O^+ ionization mode in absence of the RF device.
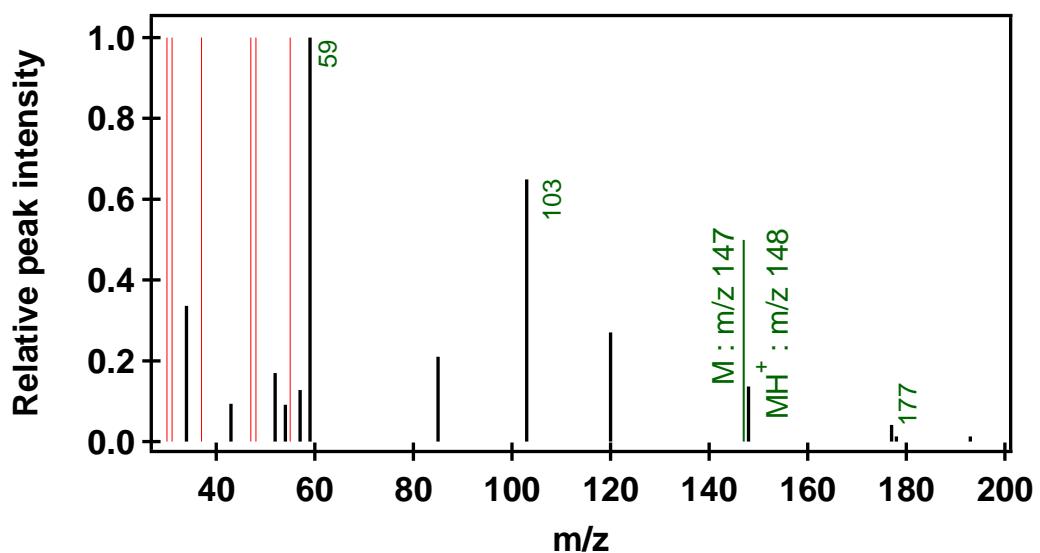
Figure S4. Recorded mass spectra of protonated KnC5 (black bars) for E/N = 75 Td, corresponding to the highest sensibility for the protonated analyte signal detection (m/z 148).
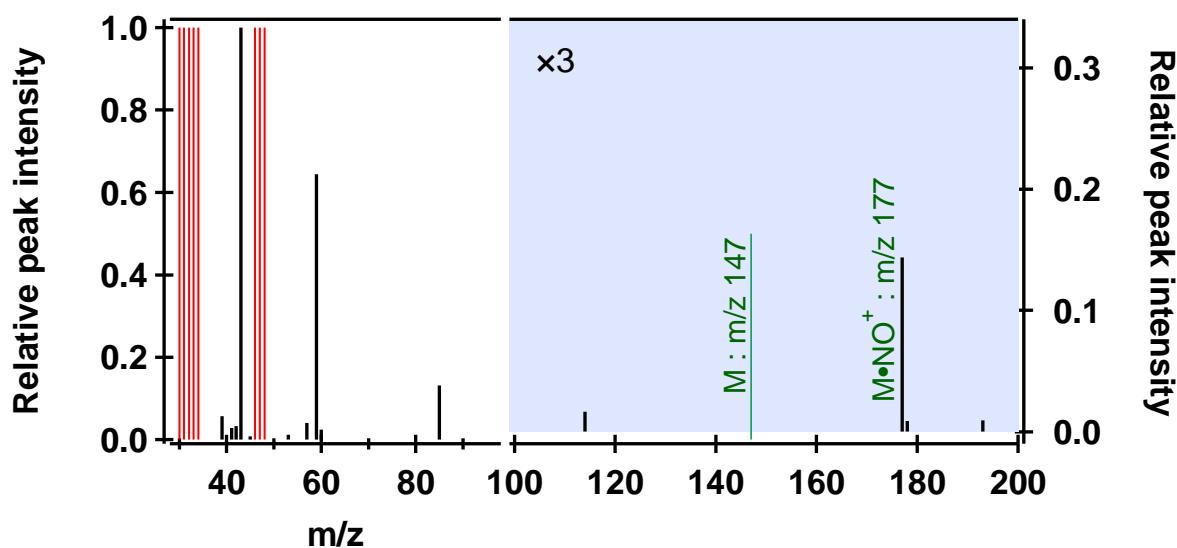
Figure S5. Recorded mass spectra of KnC5 adduct (black bars) at the lowest extent of fragmentation (E/N* = 36 Td) in the NO$^+$ ionization mode.
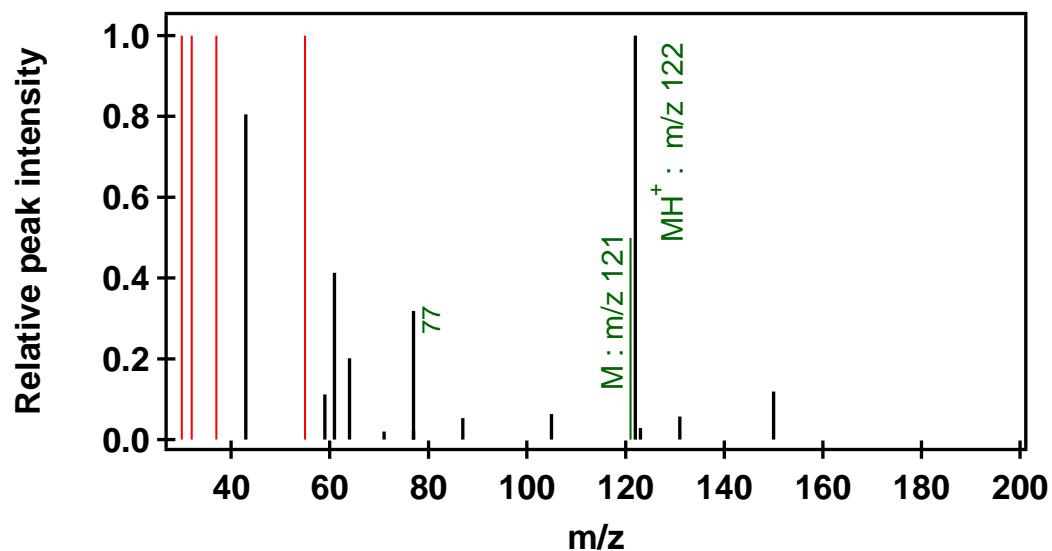
Figure S6. Recorded mass spectrum of protonated PAN (black bars) for E/N = 85 Td, corresponding to the highest sensibility of the m/z 122 signal detection.