Figure S1. (A) Resolution of the six inorganic cation peak pairs using isocratic eluent methods at a flow rate of 0.75 ml min^{-1}. (B) Resolution of the six inorganic cation peak pairs using isocratic eluent methods at a flow rate of 1.25 ml min^{-1}.
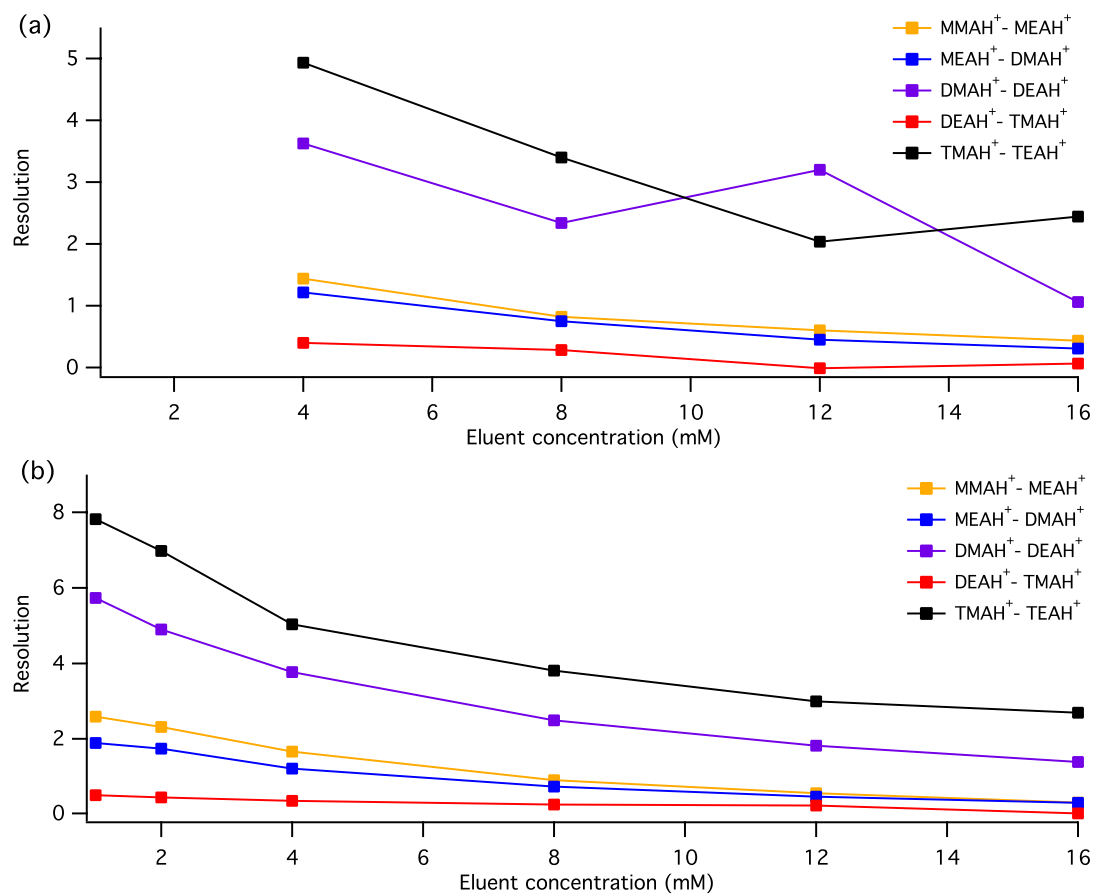
Figure S2. (A) Resolution of the six alkyl amine cation peak pairs using isocratic eluent methods at a flow rate of 0.75 ml min^{-1}. (B) Resolution of the six alkyl amine cation peak pairs using isocratic eluent methods at a flow rate of 1.25 ml min^{-1}.
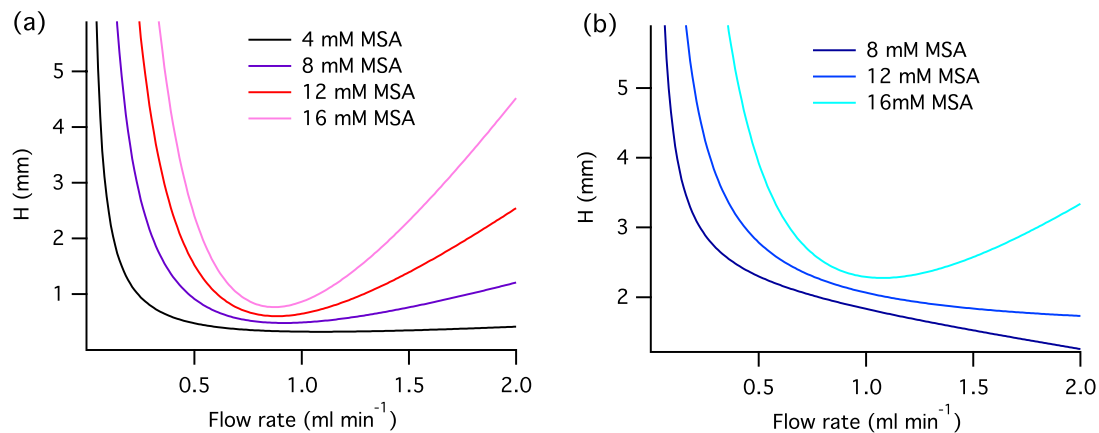
Figure S3. Calculated Van Deemter plots for the isocratic elutions of (a) MMAH$^+$ and (b) TEAH$^+$ at various MSA eluent concentrations and flow rates.
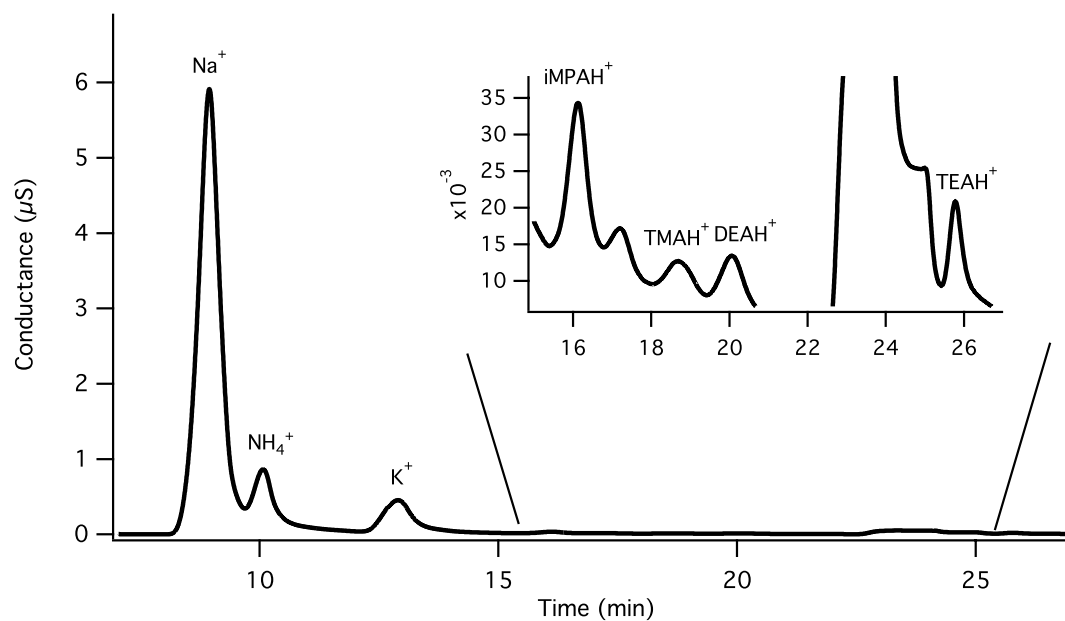

Figure S4. A chromatogram from an extracted PM$_{2.5}$ sample collected during a biomass-burning event in British Columbia at the Burnaby Kensington Park site.

Table S1. Mass loadings of amines and ammonium in size-resolved particle samples from an aged biomass burning plume sampled in St. John's, Newfoundland on July 6, 2013.

D_p (µm)	NH_4^+ mass loading (ng m⁻³)	MMA mass loading (ng m⁻³)	DMA mass loading (ng m⁻³)	TMA mass loading (ng m⁻³)	MEA mass loading (ng m⁻³)	DEA mass loading (ng m⁻³)	TEA mass loading (ng m⁻³)
10 - 18	BDL	2.0 + 0.2	0.6 + 0.2	BDL	BDL	3 + 1	2 + 1
5.6 - 10	BDL	BDL	0.7 + 0.3	2 + 2	BDL	2.2 + 0.9	2 + 1
3.2 – 5.6	BDL	0.11 + 0.03	0.4 + 0.1	BDL	BDL	BDL	BDL
1.8 – 3.2	BDL	0.10 + 0.03	0.25 + 0.09	2 + 1	BDL	1.4 + 0.6	1.3 + 0.7
1 – 1.8	BDL	2.9 + 0.8	3 + 1	3 + 2	BDL	27 + 4	4 + 2
0.56 – 1	719 + 7	1.4 + 0.4	190 + 4	5 + 3	0.4 + 0.2	1300 + 200	2 + 1
0.32 – 0.56	443 + 4	11 + 3	208 + 4	4 + 3	0.21 + 0.08	1300 + 200	4 + 2
0.18 – 0.32	236 + 2	6 + 2	80 + 2	BDL	BDL	560 + 90	2 + 1
0.10 – 0.18	30 + 50	0.4 + 0.1	30 + 10	BDL	0.6 + 0.2	200 + 30	BDL
0.056 – 0.10	20 + 30	3 + 1	6 + 2	4 + 3	BDL	58 + 9	3 + 2
0.032 – 0.056	40 + 70	0.11 + 0.03	7 + 3	BDL	BDL	49 + 8	BDL
0.018 – 0.032	BDL	0.10 + 0.03	BDL	BDL	BDL	4 + 2	BDL
0.010 – 0.018	BDL	0.30 + 0.08	BDL	BDL	BDL	BDL	BDL

BDL = below detection limits

Table S2. Mass loadings of amines and ammonium in a fresh biomass burning plume at Burnaby Kensington Park and North Vancouver/Second Narrows sites in British Columbia in July 2015.

Sampling Site	Hours before and after maximum PM₂.₅ mass loading	NH_4^+ mass loading (ng m⁻³)	iMPA mass loading (ng m⁻³)	TMA mass loading (ng m⁻³)	DEA mass loading (ng m⁻³)	TEA mass loading (ng m⁻³)
BKP	- 24	70 + 20	1.4 + 0.9	0.6 + 0.5	0.9 + 0.5	0.2 + 0.1
BKP	- 16	90 + 30	6 + 4	3 + 2	1.6 + 0.8	0.08 + 0.06
BKP	- 8	130 + 40	BDL	5 + 4	BDL	BDL
BKP	0	90 + 30	20 + 10	9 + 7	8 + 4	BDL
BKP	8	90 + 30	2 + 1	2 + 1	1.2 + 0.7	BDL
BKP	16	80 + 20	BDL	BDL	BDL	BDL
BKP	24	31 + 9	BDL	BDL	BDL	BDL
NVSN	- 24	130 + 40	5 + 3	BDL	BDL	BDL
NVSN	- 16	400 + 100	14 + 9	BDL	BDL	BDL
NVSN	0	300 + 100	40 + 30	BDL	BDL	BDL
NVSN	8	300 + 100	60 + 40	BDL	BDL	BDL
NVSN	16	70 + 20	BDL	BDL	BDL	BDL
NVSN	24	100 + 30	BDL	BDL	BDL	BDL

BDL = below detection limits