Electronic Supplementary Material (ESI) for Analytical Methods.

Direct Analysis in Real Time Mass Spectrometry (DART-MS) of Discrete Sample Areas without Heat Damage

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y (mm)								
5.5			70	112	112	114	116	
3.0		64	123	129	131	131	130	
0.5	48	130	137	141	143	143	145	
	0	2.5	5	7.5	10	12.5	15	*z* (mm)

Fig. S1 Maximum temperature (°C) observed by surface-level thermocouple with DART at a helium temperature setting of 250 °C and at various ceramic cap distances *z* from the transfer tube and heights *y* above the sample surface.

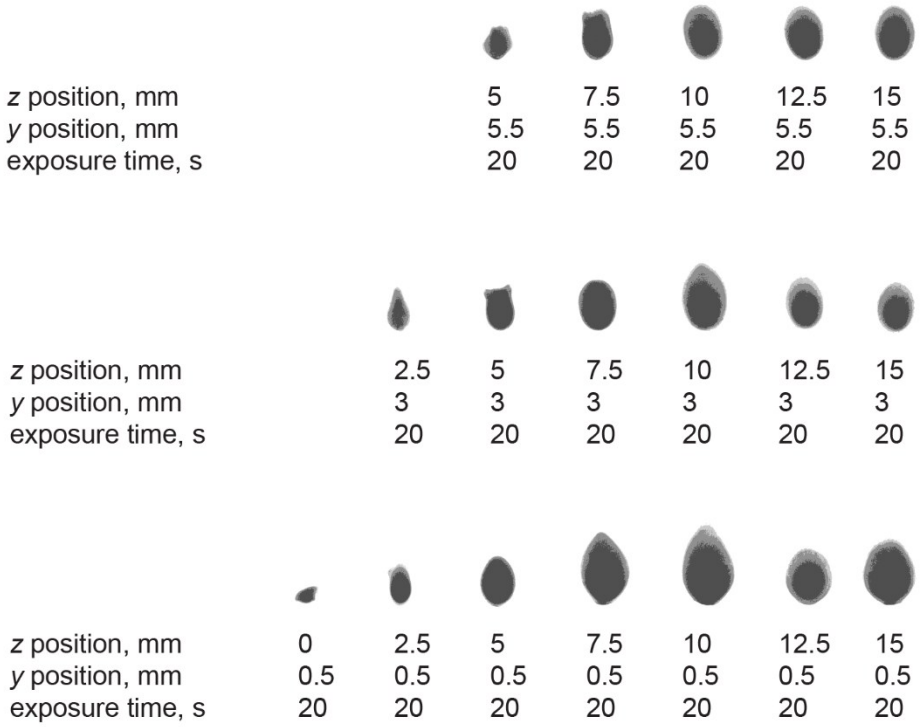

Fig. S2 Subset of analysis area prints on thermal paper produced by gas plume from DART with a helium temperature setting of 250 °C, for denoted exposure time, and at ceramic cap distances *z* from the transfer tube and heights *y* above the sample surface.

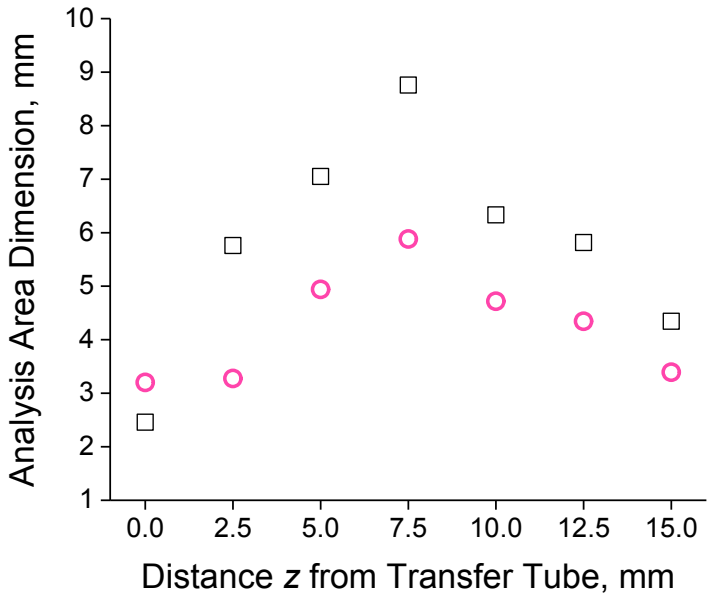

Fig. S3 Maximum length (squares) and width (circles) of analysis area coverage from 20 s DART exposure of thermal paper with a helium temperature setting of 250 °C, at various ceramic cap distances *z* from the transfer tube and 0.5 mm above the sample surface.

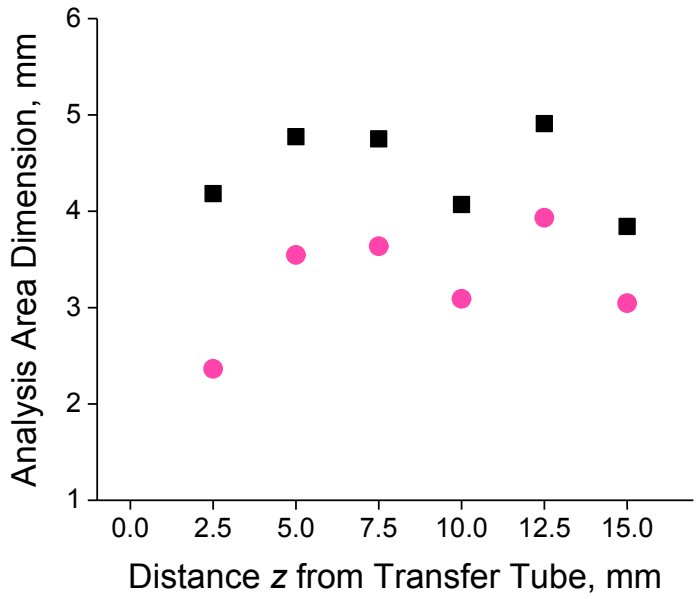

Fig. S4 Maximum length (squares) and width (circles) of analysis area coverage from 0.25 s DART exposure of thermal paper with a helium temperature setting of 250 °C, at various ceramic cap distances *z* from the transfer tube and 0.5 mm above the sample surface.

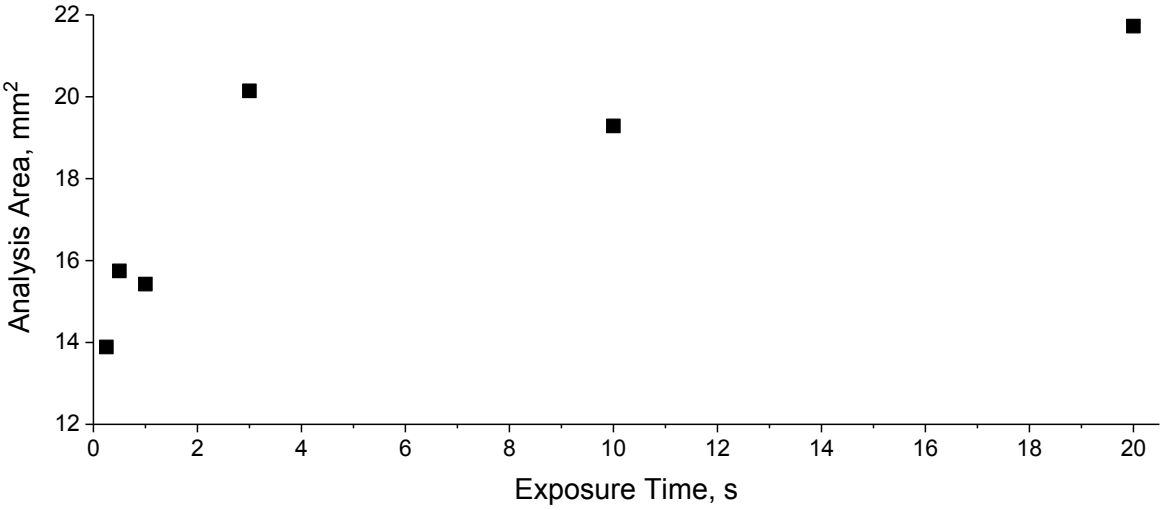

Fig. S5 Analysis area coverage by DART of thermal paper with a helium temperature setting of 250 °C and the ceramic cap at *z* 0 mm and *y* 0.5 mm, for various exposure times.

Fig. S6 Analysis area prints on thermal paper produced by gas plume from DART with a helium temperature setting of 250 °C and the ceramic cap at *z* 0 mm and *y* 0.5 mm, for various exposure times.

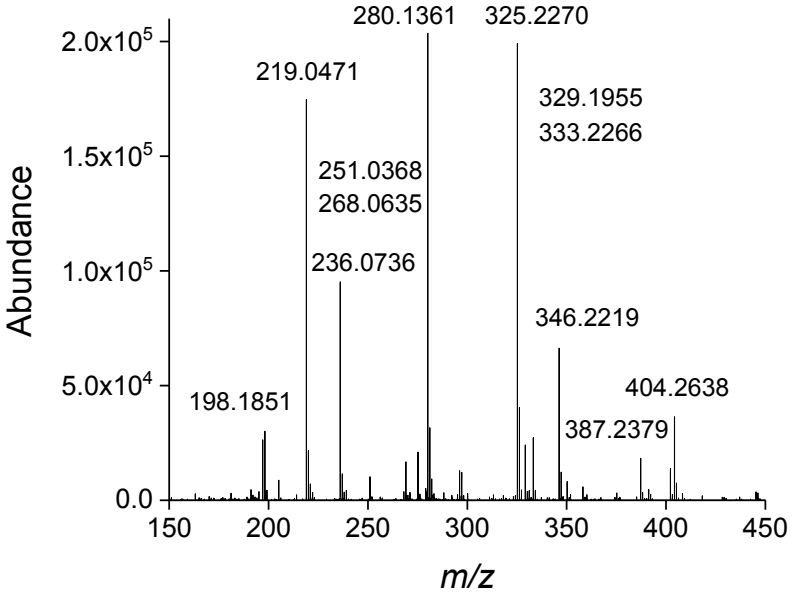

Fig. S7 Mass spectrum recorded from DART of thermal paper during 20 s exposure with a helium temperature setting of 250 °C and the ceramic cap at *z* 0 mm and *y* 0.5 mm.

a) b) c) d) e) f)

Fig. S8 Scanned gas plume impact areas on photograph exposed to DART with a helium temperature setting of 250 °C and with the ceramic cap at *z* 0 mm and *y* 0.5 mm, for exposure times of a) 20 s, b) 10 s, c) 3 s, d) 1 s, e) 0.5 s, and f) 0.25 s.

a) b)

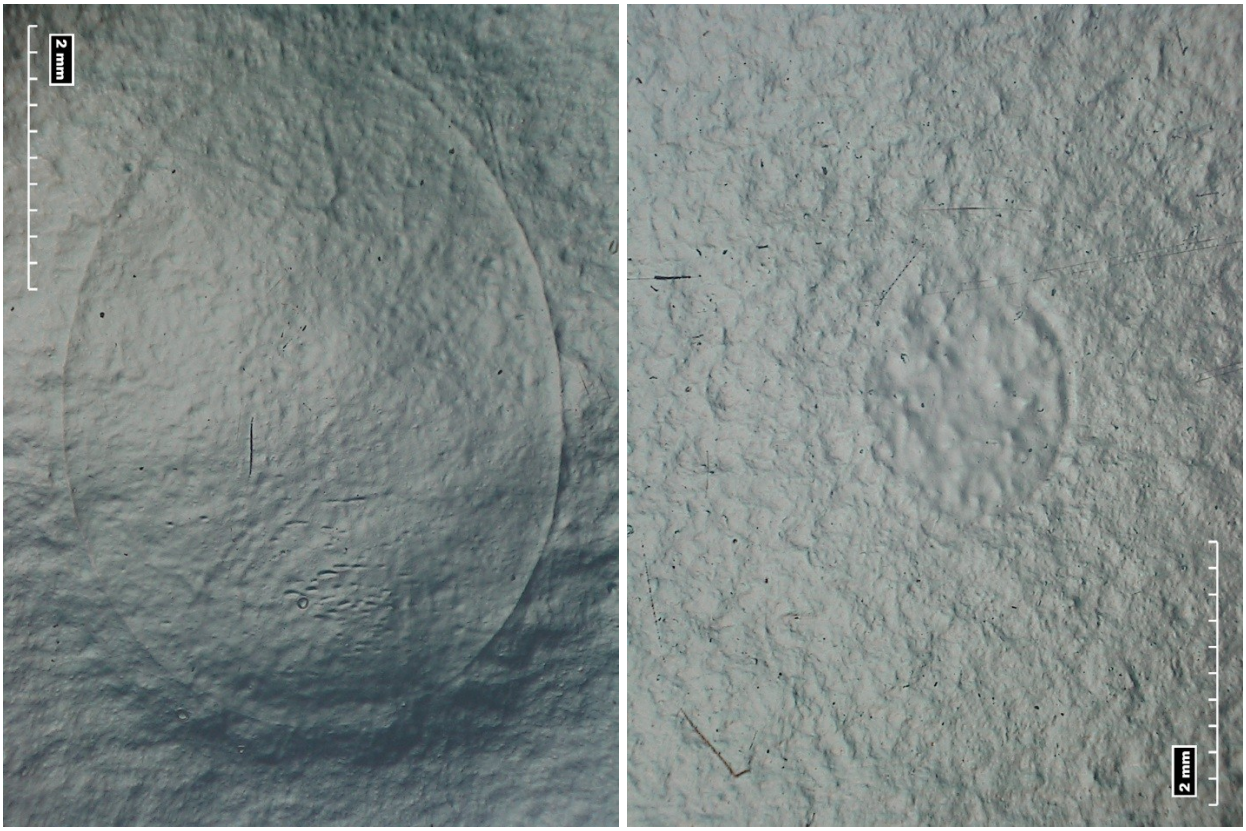

Fig. S9 Magnified gas plume impact area on photograph exposed to DART for a) 20 s and b) 0.25 s, with a helium temperature setting of 250 °C and with the ceramic cap at *z* 0 mm and *y* 0.5 mm. Analysis areas are not positioned identically within the images relative to the ceramic cap.

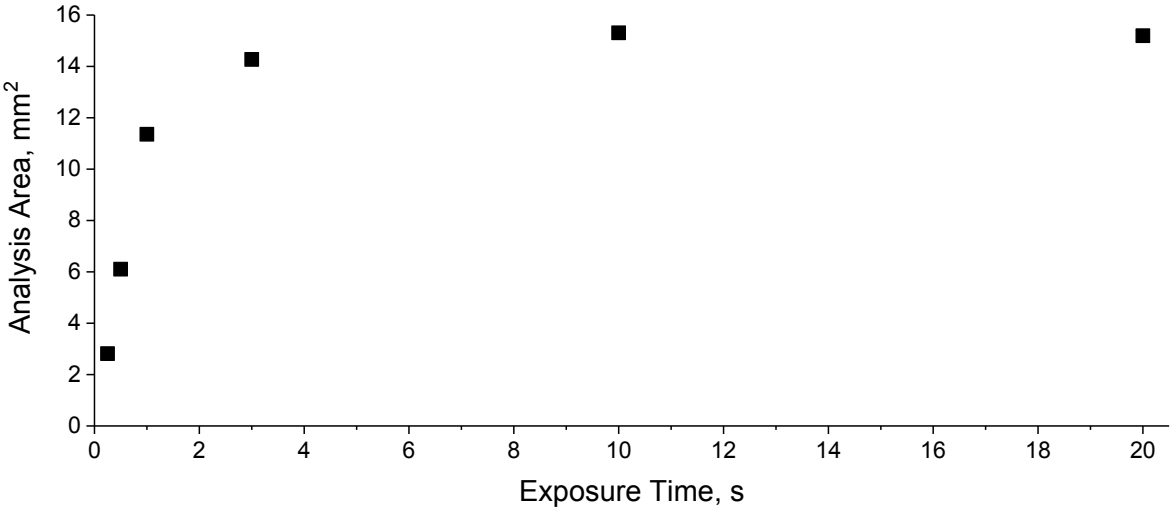

Fig. S10 Elliptical deformation area from DART gas impact on photograph with a helium temperature setting of 250 °C and the ceramic cap at *z* 0 mm and *y* 0.5 mm, for various exposure times.

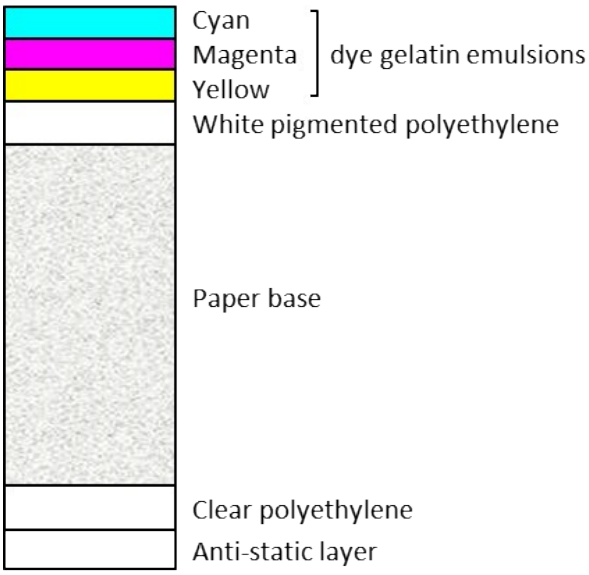

Fig. S11 General structure of RC photographs in schematic cross section, not to scale.

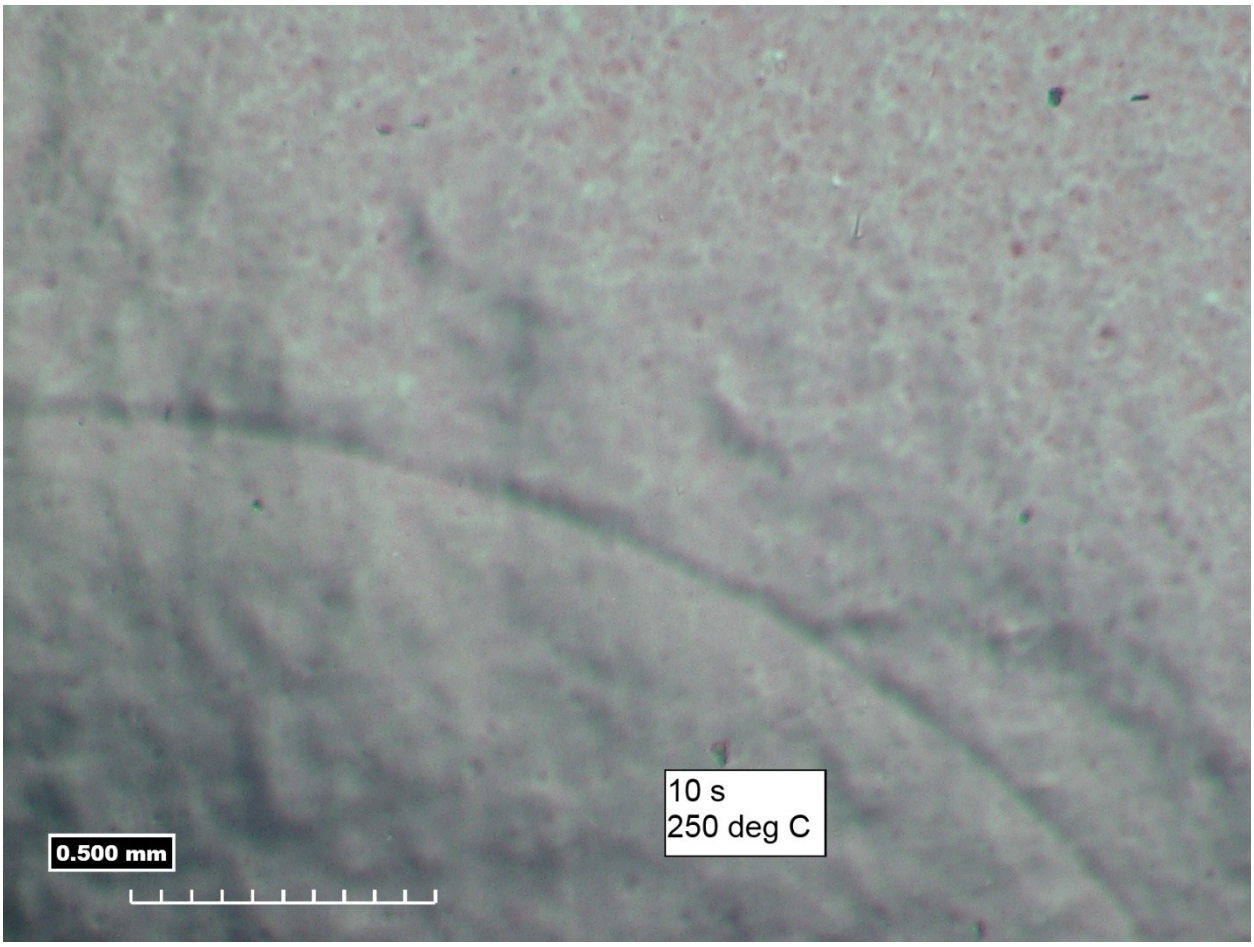

Fig. S12 Magnified gas plume impact area on photograph (lower left, rotated counter-clockwise) exposed to DART for 10 s, with the ceramic cap at *z* 0 mm and *y* 0.5 mm, at 250 °C helium temperature setting.

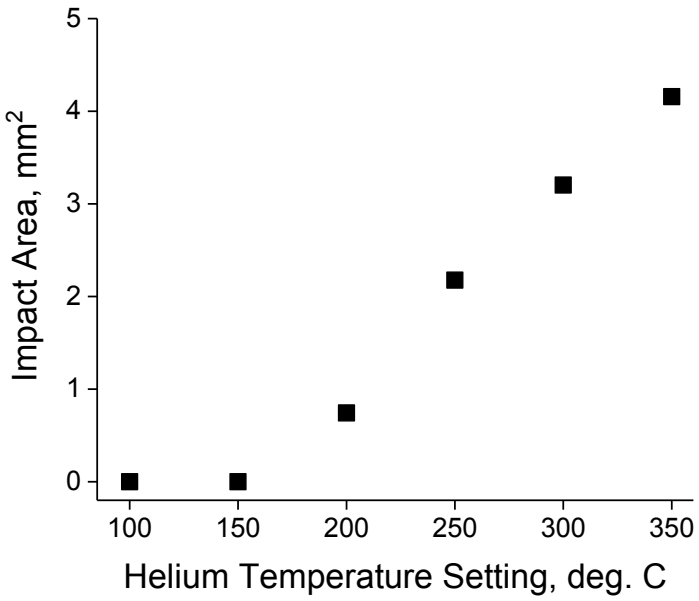

Fig. S13 Elliptical deformation area from DART gas impact on photograph for 0.25 s with the ceramic cap at *z* 0 mm and *y* 0.5 mm, with various helium temperature settings.

a) b) c) d) e) f)

Fig. S14 Scanned gas plume impact areas on photograph exposed to DART for 0.25 s at helium temperature settings of a) 100 °C, b) 150 °C, c) 200 °C, d) 250 °C, e) 300 °C, and f) 350 °C with the ceramic cap at *z* 0 mm and *y* 0.5 mm.

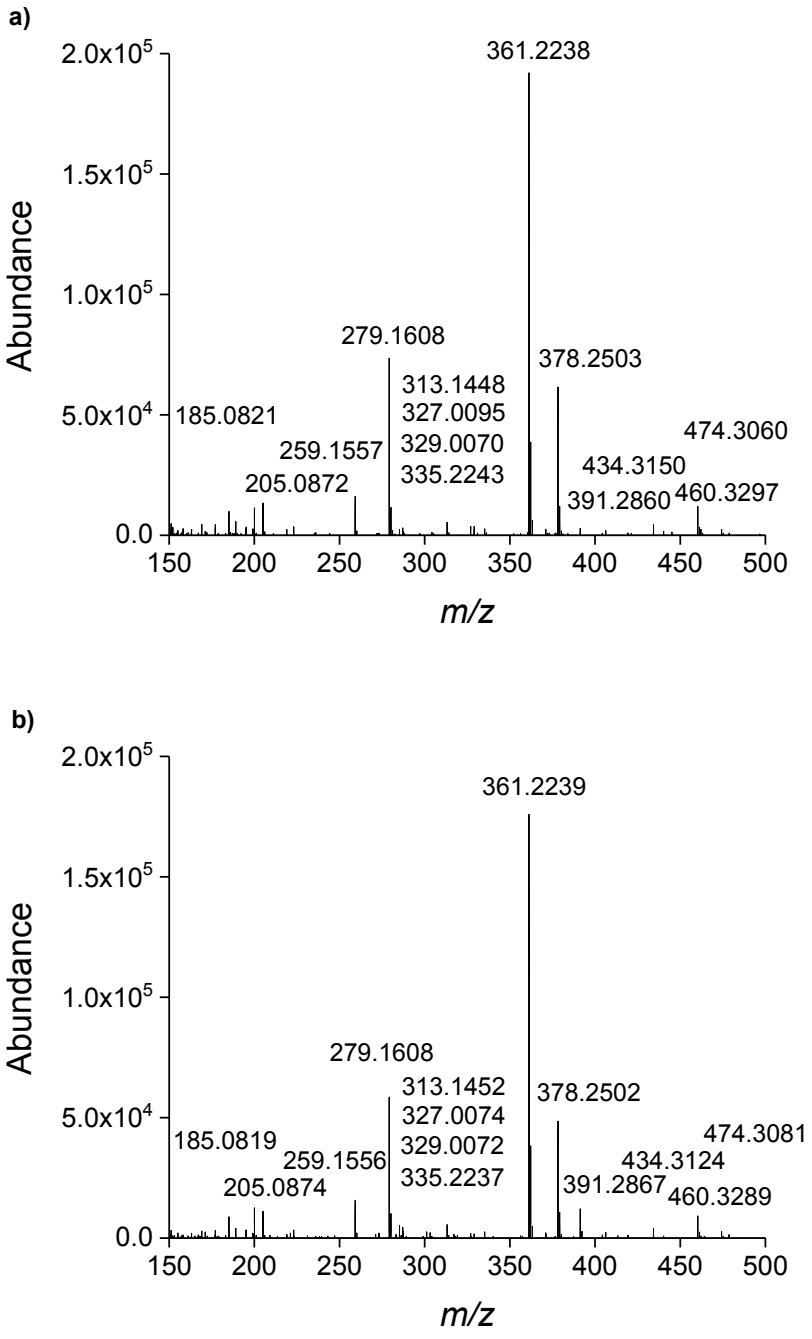

Fig. S15 Mass spectra recorded from DART of photograph with a helium temperature setting of 250 °C and the ceramic cap at *z* 0 mm and *y* 0.5 mm, at a) 0.25 s exposure and b) 0.74 seconds into a 20 s exposure. The mass spectrum with the largest ion signal of any data point within the 20 s exposure was selected for b).

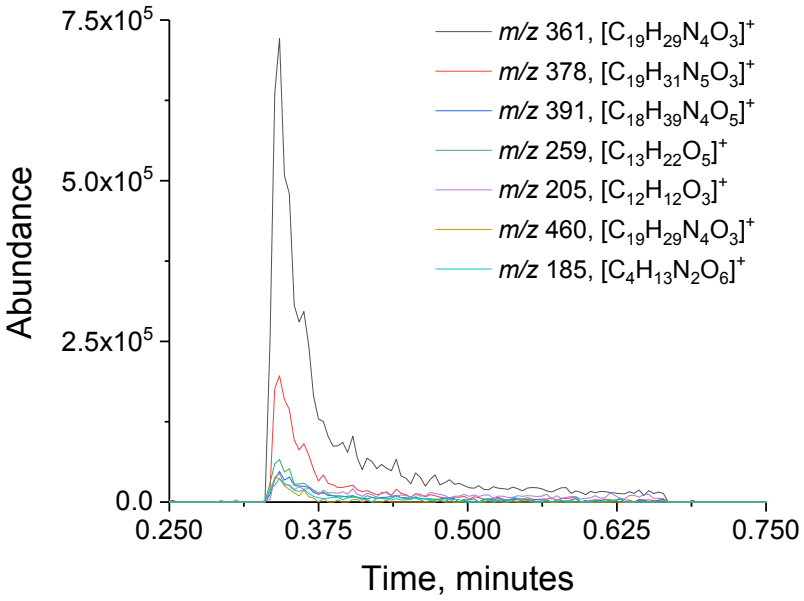

Fig. S16 Change in analyte ion signal observed over 20 s DART of photograph with a helium temperature setting of 250 °C and the ceramic cap at *z* 0 mm and *y* 0.5 mm.