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**Fig. S1** MS data for any nicotine molecular ions, e.g.  $C_{10}H_{15}N_2$  requires 163.1229 [M+H]<sup>+</sup> (found 163.1249 *m/z*) and  $C_{20}H_{29}N_4Cl$  dimer-HCl salt requires 360.2069 (found 360.3263 *m/z*).



Fig. S2 GC-MS EI spectra of (A) 5F-PB-22, (B) 1-(5F-pentyl)-indole, (C) 1-pentyl-indole.



Fig. S3 EI spectrum of (A) MDMB-CHMICA showing proposed fragmentation pattern with assignments, (B) the keto- $\delta$ -lactam with proposed fragmentation pattern and assignments.



Fig. S4 Proposed mechanism for the formation of the new combustion product.



Fig. S5 (A) UHPLC TIC chromatogram of combustion sample of MDMB-CHMICA showing
MDMB-CHMICA peak at 9.7 min, (B) expansion of the keto-δ-lactam peak at 10.7 min,
(C) ESI-MS spectrum showing both molecular ions.