

What is claimed is:

1. A method comprising:
 - forming a proton-bound adduct ion between at least one organophosphorus compound (OPC) and at least one secondary or tertiary amine in a reaction region defined between an ionization source and an ion detector; and
 - detecting the proton-bound adduct ion with the ion detector.
2. The method of Claim 1, wherein the at least one secondary or tertiary amine includes a proton affinity greater than the at least one OPC.
3. The method of Claim 1, wherein the at least one secondary or tertiary amine includes a proton affinity between 220 kcal/mol and 250 kcal/mol.
4. The method of Claim 1, wherein the at least one OPC is an analyte and the at least one secondary or tertiary amine is a dopant and detecting the proton-bound adduct ion with the ion detector confirms the presence of the at least one OPC.
5. The method of Claim 4, wherein the at least one OPC is a phosphonate or an organophosphate.
6. The method of Claim 4, wherein the dopant is a dialkylamine, an alkyl-substituted derivative of pyridine, or a trialkylamine.
7. The method of Claim 6, wherein the dialkylamine or the trialkylamine has R groups with between 1 and 12 carbons.
8. The method of Claim 6, wherein the at least one OPC is detectable at 100 parts-per-quadrillion or better.
9. The method of Claim 1, wherein the at least one secondary or tertiary amine is an illicit drug, and wherein the illicit drug is an analyte and the at least one OPC is a dopant and detecting the proton-bound adduct ion with the ion detector confirms the presence of the illicit drug.

10. The method of Claim 9, wherein the at least one OPC is a phosphonate or an organophosphate.
11. The method of Claim 9, wherein the illicit drug is heroin, cocaine, or methamphetamine.
12. The method of Claim 9, wherein the illicit drug is detectable at 160 parts-per-quadrillion or better.
13. The method of Claim 1, wherein the ion detector is a mass spectrometer or an ion mobility spectrometer.
14. The method of Claim 1, further including ionizing a vapor sample comprising the at least one secondary or tertiary amine and/or the at least one OPC therein with the ionization source, wherein the at least one secondary or tertiary amine has a proton affinity greater than or equal to about 220 kcal/mol.
15. A method comprising:
 - ionizing a vapor sample with an ionization source, the vapor sample containing at least one organophosphorus compound (OPC) and at least one secondary or tertiary amine;
 - introducing the ionized vapor sample containing the at least one OPC and at least one secondary or tertiary amine therein into a reaction region defined between the ionization source and an ion detector;
 - forming at least one proton-bound adduct ion between the at least one OPC and the at least one secondary or tertiary amine therein; and
 - detecting the at least one proton-bound adduct ion with the ion detector.
16. The method of Claim 15, wherein the at least one secondary or tertiary amine has a proton affinity greater than the at least one OPC.
17. The method of Claim 15, wherein the at least one secondary or tertiary amine has a proton affinity between 220 kcal/mol and 250 kcal/mol.

18. The method of Claim 15, wherein the at least one OPC is an analyte and the at least one secondary or tertiary amine is a dopant and detecting the proton-bound adduct ion with the ion detector confirms the presence of the at least one OPC.
19. The method of Claim 18, wherein the dopant is a dialkylamine, alkyl-substituted derivative of pyridine, or a trialkylamine.
20. The method of Claim 18, wherein the dialkylamine or the trialkylamine has R groups with between 1 and 12 carbons.
21. The method of Claim 15, wherein the at least one OPC is detectable at 100 parts-per-quadrillion or better.
22. The method of Claim 15, wherein the at least one secondary or tertiary amine is an illicit drug, and wherein the illicit drug is an analyte and the at least one OPC is a dopant and detecting the proton-bound adduct ion with the ion detector confirms the presence of the illicit drug.
23. The method of Claim 22, wherein the illicit drug is detectable at or greater than 160 parts-per-quadrillion.
24. The method of Claim 15, wherein the ion detector is a mass spectrometer or an ion mobility spectrometer.
25. The method of claim 7, wherein the dialkylamine is diethylamine, diisopropyl amine, diethylmethyl amine, or combinations thereof, or wherein the trialkylamine is triethylamine, tripropylamine, tributylamine, trioctylamine, tridecylamine, tridodecylamine, or combinations thereof.
26. The method of claim 20, wherein the dialkylamine is diethylamine, diisopropyl amine, diethylmethyl amine, or combinations thereof, or wherein the trialkylamine is triethylamine, tripropylamine, tributylamine, trioctylamine, tridecylamine, tridodecylamine, or combinations thereof.