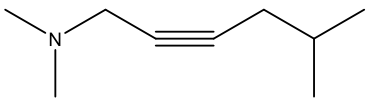
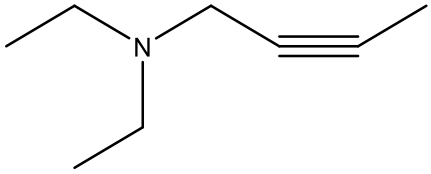
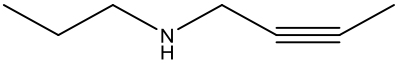
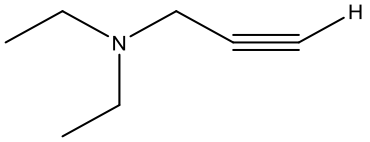
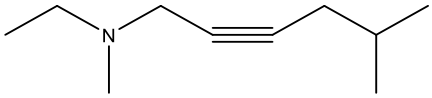
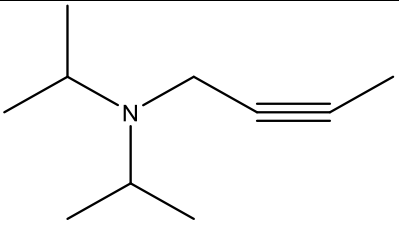
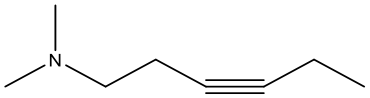
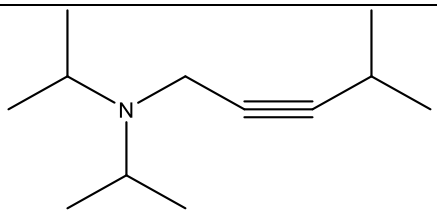
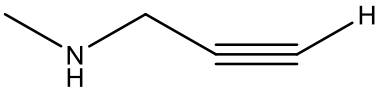
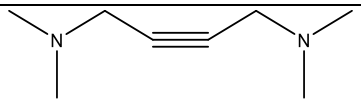
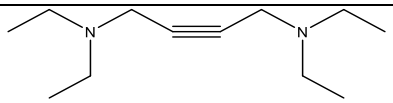
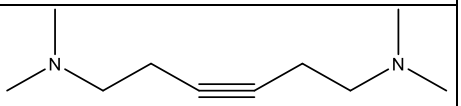
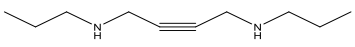
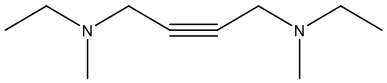
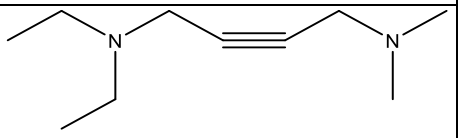
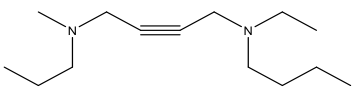
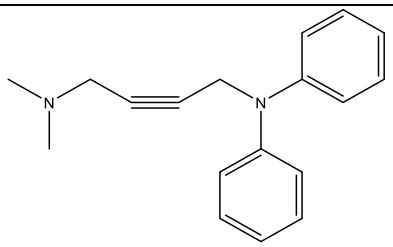
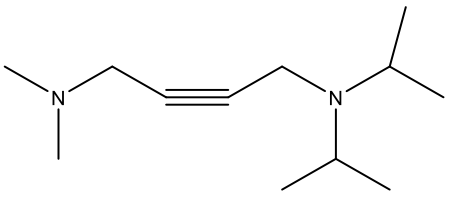
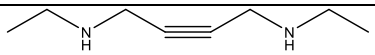
CLAIMS

What is claimed is:

1. A high purity alkynyl amine having (a) a concentration of halogen-containing impurities of less than about 10 ppm and (b) a concentration of water of less than about 100 ppm.

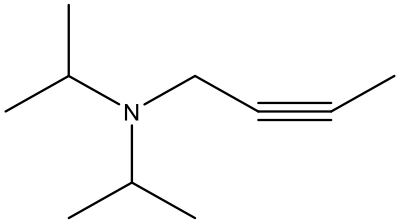
2. The high purity alkynyl amine of claim 1, wherein the high purity alkynyl amine is one or more of:

Alkynyl amine Structure	Alkynyl amine Structure	Alkynyl amine Structure
 **1A**	 **1B**	 **1C**
 **1D**	 **1E**	 **1F**
 **1G**	 **1H**	 **1I**
 **2A**	 **2B**	 **2C**
 **2D**	 **2E**	 **2F**
 **2G**	 **2H**	 **2I**



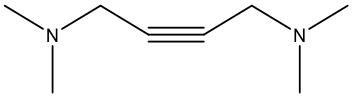
2J

3. The formulation of claim 1, wherein the high purity alkynyl amine comprises:



.

4. The formulation of claim 1, wherein the high purity alkynyl amine comprises:



.

5. The high purity alkynyl amine of any of claims 1-4, wherein the high purity alkynyl amine comprises 0.001 wt. % or less of halides.

6. The high purity alkynyl amine of any of claims 1-4, wherein the high purity alkynyl amine comprises 0.001 wt. % or less of water.

7. The high purity alkynyl amine of claim 1, wherein the high purity alkynyl amine comprises 0.001 wt. % or less of halides and water.

8. A surface passivating formulation comprising **(i)** one or more high purity alkynyl amine of any of claims 1-7.

9. A surface passivating formulation comprising

(i) two or more high purity alkynyl amines of any of claims 1-7.

10. The surface passivating formulation of claim 8, wherein the **(i)** one or more high purity alkynyl amine comprises one or more of N,N-(1-di-isopropylamino)-2-butyne (1F) and 1,4-bis(dimethylamino)-2-butyne (2A).

11. A method for forming a film on at least one surface of a substrate comprising:

- **a.** providing the at least one surface of the substrate in a reaction vessel;
- **b.** forming at least one passivated surface by exposing the at least one surface to one or more of the high purity alkynyl amines of any of claims 1-7 and one or more precursor.

12. The method of claim 11, wherein the method comprises an atomic layer deposition process (ALD).

13. The method of claim 11, wherein the method comprises a plasma enhanced ALD (PEALD).

14. The method of claim 11, wherein the method comprises a chemical vapor deposition process (CVD).

15. The method of any of claims 11-14, wherein the one or more precursors comprises one or more of trimethylaluminum, *tetrakis*(dimethylamido)titanium, *tetrakis*(ethylmethylamido)zirconium, *tetrakis*(ethylmethylamido)hafnium, *pentakis*(dimethylamido)tantalum and *tris*(isopropylcyclopentadienyl)lanthanum.