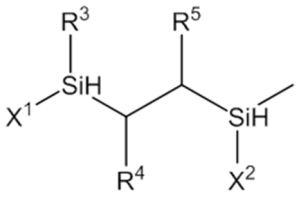
Claims:

1. A composition for vapor deposition of a silicon-based film, the composition comprising at least one organosilicon precursor compound having the chemical structure of Formula A:



(A), wherein

X^1 is an organoamino group having the formula NR^1R^2 wherein

R^1 is selected from the group consisting of a linear C_1 to C_{10} alkyl group, a branched C_3 to C_{10} alkyl group, a cyclic C_3 to C_{10} alkyl group, a linear or branched C_3 to C_{10} alkenyl group, a linear or branched C_3 to C_{10} alkynyl group, a C_1 to C_6 dialkylamino group, an electron withdrawing group, and a C_6 to C_{10} aryl group; and

R^2 is selected from the group consisting of a hydrogen atom, a linear C_1 to C_{10} alkyl group, a branched C_3 to C_{10} alkyl group, a cyclic C_3 to C_{10} alkyl group, a linear or branched C_3 to C_6 alkenyl group, a linear or branched C_3 to C_6 alkynyl group, a C_1 to C_6 dialkylamino group, a C_6 to C_{10} aryl group, a linear C_1 to C_6 fluorinated alkyl group, a branched C_3 to C_6 fluorinated alkyl group, an electron withdrawing group, and a C_4 to C_{10} aryl group and, optionally, wherein R^1 and R^2 are linked together to form a ring selected from a substituted or unsubstituted aromatic ring or a substituted or unsubstituted aliphatic ring;

R^3, R^4, and R^5 are each a hydrogen atom; and X^2 is hydrogen.

2. The composition of claim 1 wherein the organosilicon precursor comprises 1-di-iso-propylamino-1,4-disilapentane.

3. The composition of claim 1 further comprising a nitrogen-containing precursor and wherein a ratio of the amount of the nitrogen-containing precursor to the amount of the at least one organosilicon precursor ranges from about 0.25 to about 1.

4. The composition of claim 1 wherein the at least one silicon precursor comprises 1,4-disilapentane.

5. The composition of claim 1 wherein the at least one silicon precursor comprises at least one silicon precursor selected from the group consisting of dimethylamino-1,4-disilapentane, 1-diethylamino-1,4-disilapentane, 1-methylethylamino-1,4-disilapentane, 1-di-n-propylamino-1,4-disilapentane, 1-di-iso-propylamino-1,4-disilapentane, 1-iso-propylamino-1,4-disilapentane, 1-sec-butylamino-1,4-disilapentane, 1-tert-butylamino-1,4-disilapentane, 1-(2,6-dimethylpiperidino)-1,4-disilapentane, 1-piperidino-1,4-disilapentane, 1-(cyclohexyl-iso-propylamino)-1,4-disilapentane, and 1-(n-propyl-iso-propylamino)-1,4-disilapentane.