CLAIMS

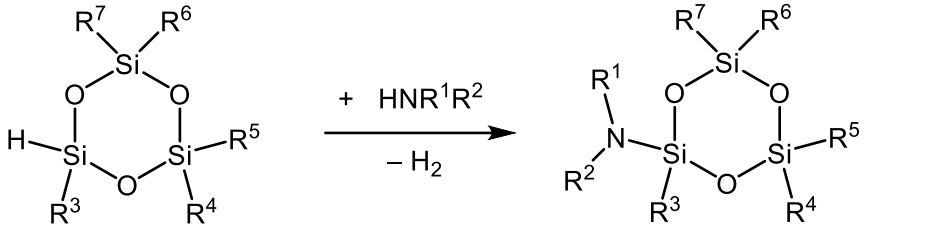
1. A composition comprising at least one organoamino-functionalized cyclic oligosiloxane compound selected from the group consisting of 2-pyrrolyl-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-(2-methylpiperidino)-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-(2,6-dimethylpiperidino)-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-cyclohexylmethylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-phenylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-phenylmethylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-cyclohexylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-cyclopentylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-pyrrolidino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-pyrrolyl-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-piperidino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-(2-methylpiperidino)-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-(2,6-dimethylpiperidino)-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-cyclohexylmethylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-phenylmethylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-cyclohexylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-cyclopentylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-pyrrolyl-2,4,6-trimethylcyclotrisiloxane, 2-(2-methylpiperidino)-2,4,6-trimethylcyclotrisiloxane, 2-(2,6-dimethylpiperidino)-2,4,6-trimethylcyclotrisiloxane, 2-cyclohexylmethylamino-2,4,6-trimethylcyclotrisiloxane, 2-phenylamino-2,4,6-trimethylcyclotrisiloxane, 2-phenylmethylamino-2,4,6-trimethylcyclotrisiloxane, 2-cyclohexylamino-2,4,6-trimethylcyclotrisiloxane, 2-cyclopentylamino-2,4,6-trimethylcyclotrisiloxane, 2-pyrrolidino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-pyrrolyl-2,4,6,8-tetramethylcyclotetrasiloxane, 2-piperidino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-(2-methylpiperidino)-2,4,6,8-tetramethylcyclotetrasiloxane, 2-(2,6-dimethylpiperidino)-2,4,6,8-tetramethylcyclotetrasiloxane, 2-cyclohexylmethylamino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-phenylamino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-phenylmethylamino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-cyclohexylamino-2,4,6,8-tetramethylcyclotetrasiloxane, and 2-cyclopentylamino-2,4,6,8-tetramethylcyclotetrasiloxane.

2. The composition of claim 1 further comprising at least one selected from the group consisting of a solvent and a purge gas.

3. The composition of claim 1, wherein the composition is substantially free of one or more impurities selected from the group consisting of a halide, metal ions, metal, and combinations thereof.

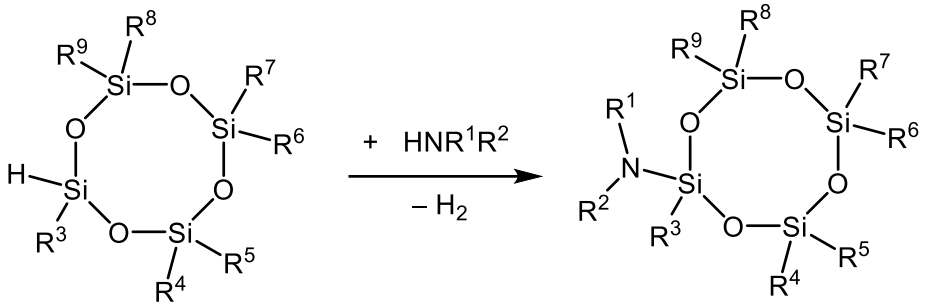
4. A method for making the organoamino-functionalized cyclic oligosiloxane compound of claim 1, the method comprising the steps of:

reacting a cyclotrisiloxane of Formula (i) or a cyclotetrasiloxane compound of Formula (iii) with an organoamine in the presence of a catalyst as shown in Equations (1) or (3):



(1)

(i) (A)



(3)

(iii) (B)

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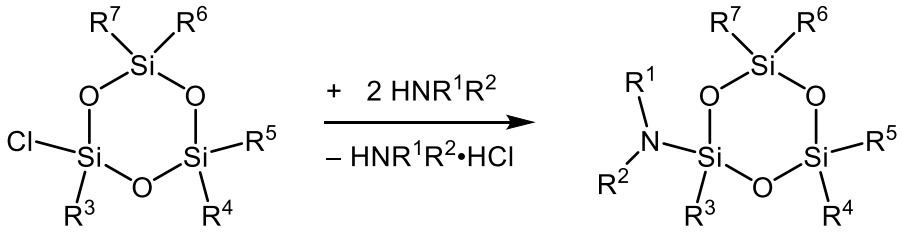
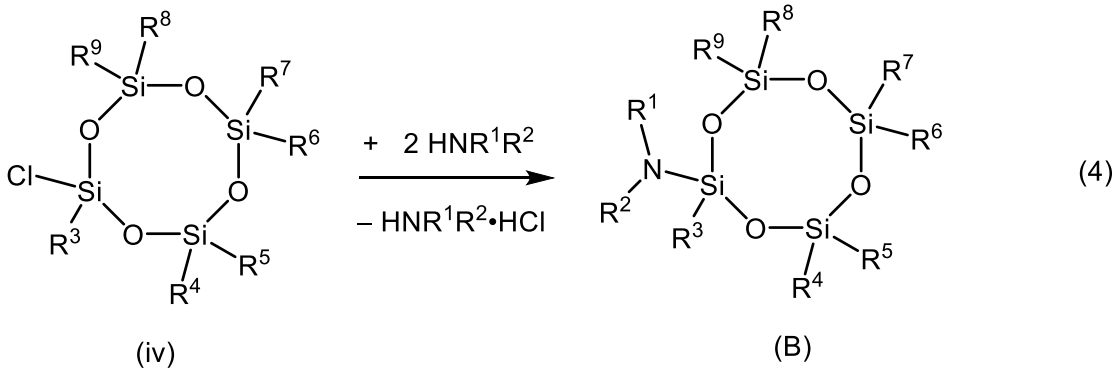
or reacting a chlorinated cyclotrisiloxane of Formula (ii) or a chlorinated cyclotetrasiloxane of Formula (iv) with an organoamine or metal salt of an organoamine in the presence of a catalyst as shown in Equations (2) or (4):



(2)

(ii) (A)



(iv) (B) (4)

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wherein either (i) R^1 is selected from the group consisting of a C_3 to C_{10} cyclic alkyl group, and a C_3 to C_{10} aryl group, R^2 is selected from the group consisting of hydrogen and a C_1 to C_4 alkyl group, and R^{3-9} are each independently selected from hydrogen and a C_1 to C_4 alkyl group; or (ii) R^1 and R^2 are linked to form a C_3 to C_{10} heterocyclic structure or a C_3 to C_{10} heterocyclic aryl structure, either of which may be substituted by one, two, or more methyl groups, and R^{3-9} are each independently selected from hydrogen and a C_1 to C_4 alkyl group.

5. A method for depositing a film comprising silicon and oxygen onto a substrate, the method comprising the steps of:

a) providing a substrate in a reactor;

b) introducing into the reactor at least one silicon precursor compound selected from the group consisting of 2-pyrrolidino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-pyrrolyl-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-piperidino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-(2-methylpiperidino)-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-(2,6-dimethylpiperidino)-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-cyclohexylmethylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-phenylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-phenylmethylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-cyclohexylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-cyclopentylamino-2,4,4,6,6-pentamethylcyclotrisiloxane, 2-pyrrolidino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-pyrrolyl-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-piperidino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-(2-methylpiperidino)-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-(2,6-dimethylpiperidino)-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-cyclohexylmethylamino-2,4,4,6,6,8,8-

heptamethylcyclotetrasiloxane, 2-phenylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-phenylmethylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-cyclohexylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-cyclopentylamino-2,4,4,6,6,8,8-heptamethylcyclotetrasiloxane, 2-pyrrolidino-2,4,6-trimethylcyclotrisiloxane, 2-pyrrolyl-2,4,6-trimethylcyclotrisiloxane, 2-piperidino-2,4,6-trimethylcyclotrisiloxane, 2-(2-methylpiperidino)-2,4,6-trimethylcyclotrisiloxane, 2-(2,6-dimethylpiperidino)-2,4,6-trimethylcyclotrisiloxane, 2-cyclohexylmethylamino-2,4,6-trimethylcyclotrisiloxane, 2-phenylamino-2,4,6-trimethylcyclotrisiloxane, 2-phenylmethylamino-2,4,6-trimethylcyclotrisiloxane, 2-cyclohexylamino-2,4,6-trimethylcyclotrisiloxane, 2-cyclopentylamino-2,4,6-trimethylcyclotrisiloxane, 2-pyrrolidino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-pyrrolyl-2,4,6,8-tetramethylcyclotetrasiloxane, 2-piperidino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-(2-methylpiperidino)-2,4,6,8-tetramethylcyclotetrasiloxane, 2-(2,6-dimethylpiperidino)-2,4,6,8-tetramethylcyclotetrasiloxane, 2-cyclohexylmethylamino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-phenylamino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-phenylmethylamino-2,4,6,8-tetramethylcyclotetrasiloxane, 2-cyclohexylamino-2,4,6,8-tetramethylcyclotetrasiloxane, and 2-cyclopentylamino-2,4,6,8-tetramethylcyclotetrasiloxane;

c) purging the reactor with a purge gas;

d) introducing at least one of an oxygen-containing source and a nitrogen-containing source into the reactor; and

e) purging the reactor with the purge gas,

wherein the steps b through e are repeated until a desired thickness of film is deposited; and wherein the method is conducted at one or more temperatures ranging from about 25°C to 600°C.

6. A stainless steel container housing the composition of claim 1.

7. The stainless steel container of claim 6 further comprising an inert head-space gas selected from helium, argon, nitrogen and combinations thereof.

8. The method of claim 5 wherein the silicon precursor compound further comprises at least one selected from the group consisting of a solvent and an inert gas.