CLAIMS

1. A composition for a vapor deposition of a silicon-containing dielectric film comprising at least one silacycloalkane precursor selected from the group consisting of 1,3-bis(tert-butyl)silacycloalkane, 1,3-bis(tert-butyl)-2-methylsilacycloalkane, 1,3-bis(tert-butyl)-2,4-dimethylsilacycloalkane, 1,3-bis(tert-amyl)silacycloalkane, 1,3-bis(tert-amyl)-2-methylsilacycloalkane, 1,3-bis(tert-amyl)-2,4-dimethylsilacycloalkane, 1,3-bis(tert-butyl)-2-chloroclodisilazane, 1,3-bis(tert-butyl)-2,4-dichlorosilacycloalkane, 1,3-bis(tert-amyl)-2-chloroclodisilazane, 1,3-bis(tert-amyl)-2,4-dichlorosilacycloalkane, 1,3-bis(tert-butyl)-2,4,4-trilchlorosilacycloalkane, 1,3-bis(tert-butyl)-2-dimethylsilacycloalkane, 1,3-bis(tert-butyl)-2-chloro-2-methylsilacycloalkane, 1,3-bis(tert-amyl)-2-dimethylsilacycloalkane, 1,3-bis(tert-amyl)-2-chloro-2-methyl-silacycloalkane, 1,3-bis(tert-butyl)-2-vinylsilacycloalkane, 1,3-bis(tert-butyl)-2-ethynyl silacycloalkane, 1,3-dicyclopropyl-1,3-disilacyclobutane, 1,3-dicyclopropyl-1,3-dimethyl-1,3-disilacyclobutane, and 1,1,3,3-tetracyclopropyl-1,3-disilacyclobutane, wherein the silacycloalkane precursor is substantially free of one or more impurities selected from the group consisting of a halide, water, metal ions, and combinations thereof.

2. The composition of claim 1, wherein the halide comprises chloride ions.

3. The composition of claim 2, wherein the chloride ion concentration is less than 50 ppm.

4. The composition of claim 2, wherein the chloride ion concentration is less than 10 ppm.

5. The composition of claim 2, wherein the chloride ion concentration is less than 5 ppm.

6. A vessel which is used to deliver a silacycloalkane precursor for the deposition of a silicon-containing film, the vessel comprising:

a silacycloalkane precursor selected from the group consisting of 1,3-bis(tert-butyl)silacycloalkane, 1,3-bis(tert-butyl)-2-methylsilacycloalkane, 1,3-bis(tert-butyl)-2,4-dimethylsilacycloalkane, 1,3-bis(tert-amyl)silacycloalkane, 1,3-bis(tert-amyl)-2-methylsilacycloalkane, 1,3-bis(tert-amyl)-2,4-dimethylsilacycloalkane, 1,3-bis(tert-butyl)-2-chloroclodisilazane, 1,3-bis(tert-butyl)-2,4-dichlorosilacycloalkane, 1,3-bis(tert-amyl)-2-chloroclodisilazane, 1,3-bis(tert-amyl)-2,4-dichlorosilacycloalkane, 1,3-bis(tert-butyl)-2,4,4-trilchlorosilacycloalkane, 1,3-bis(tert-butyl)-2-dimethylsilacycloalkane, 1,3-bis(tert-butyl)-2-chloro-2-methylsilacycloalkane, 1,3-bis(tert-amyl)-2-dimethylsilacycloalkane, 1,3-bis(tert-amyl)-2-chloro-2-methyl-silacycloalkane, 1,3-bis(tert-butyl)-2-vinylsilacycloalkane, 1,3-bis(tert-butyl)-2-ethynyl silacycloalkane1,3-bis(tert-butyl)-2-vinylsilacycloalkane, 1,3-bis(tert-butyl)-2-ethynyl silacycloalkane, 1,3-dicyclopropyl-1,3-disilacyclobutane, 1,3-dicyclopropyl-1,3-dimethyl-1,3-disilacyclobutane, and 1,1,3,3-tetracyclopropyl-1,3-disilacyclobutane, wherein the silacycloalkane precursor is substantially free of one or more impurities selected from the group consisting of a halide, water, metal ions, and combinations thereof, wherein the purity of the precursor is about 98% or greater, and wherein the vessel has a headspace comprising at least one inert gas selected from the group consisting of helium, argon, nitrogen and combination thereof.

7. The vessel of claim 6 wherein the vessel is comprised of stainless steel.