

CLAIMS

1. A composition for forming a silicon-containing material, the composition comprising:
 - (a) at least one silicon precursor compound comprising bis(disilylamino)silane; and
 - 5 (b) a solvent wherein the solvent has a boiling point and the difference between the boiling point of the solvent and a boiling point of the silicon precursor is 40°C or less.
2. The composition of claim 1 comprising at least one solvent selected from the group consisting of ether, tertiary amine, alkyl hydrocarbon, aromatic hydrocarbon, and
10 tertiary aminoether.
3. The composition of claim 1 wherein the solvent comprises at least one selected from the group consisting of octane, ethylcyclohexane, cyclooctane, and toluene.
- 15 4. A method for depositing a silicon nitride film on at least a portion of a surface of a substrate, the method comprising:
 - a. placing the substrate into a reactor;
 - b. introducing into the reactor at least one silicon precursor compound comprising bis(disilylamino)silane under conditions sufficient to provide a
20 chemisorbed layer;
 - c. purging the reactor with a purge gas;
 - d. introducing a plasma source comprising nitrogen into the reactor to react with at least a portion of the chemisorbed layer; and
 - e. optionally purge the reactor with an inert gas; and wherein the steps b
25 through e are repeated until a desired thickness of the silicon nitride film is obtained.
5. The method of claim 4 wherein the plasma source is selected from the group consisting of nitrogen plasma, nitrogen/helium plasma, nitrogen/argon plasma,

ammonia plasma, ammonia/helium plasma, ammonia/argon/plasma, helium plasma, argon plasma, hydrogen plasma, hydrogen/helium plasma, hydrogen/argon plasma, organic amine plasma, and mixtures thereof.

5

6. The method of claim 4 wherein the plasma in step d is generated at a power density ranging from 0.01 to 1.5 W/cm².