What is claimed is:

1. A system for removing materials from a semiconductor device structure, comprising:

a processing chamber configured to receive the semiconductor device structure comprising silicon nitride, wherein the semiconductor device structure is exposed to an etchant in the processing chamber to remove a portion of the structure by etching silicon nitride from the semiconductor device and generate a by-product that enters the etchant;

a by-product removal section configured to convert the by-product into a precipitate by providing a precipitation accelerator to react with the by-product and remove the precipitate, thereby removing the by-product continuously; and

a circulation line that re-introduce the etchant to the processing chamber after the by-product's removal,

2. The system of claim 1, wherein the by-product removal section comprises a precipitation accelerator supply portion.

3. The system of claim 2, wherein the precipitation accelerator supply portion comprises a filter, wherein the filter is configured to remove the precipitate.

4. The system of claim 3, wherein the by-product removal section further comprises a precipitation chamber provided on an upstream side of the filter, wherein the precipitation accelerator supply portion is configured to supply the precipitation accelerator to the precipitation chamber.

5. The system of claim 1 further comprising an etchant processing section wherein the etchant processing section is configured to prepare the etchant.

6. The system of claim 5, wherein the etchant processing section is configured to store the etchant.

7. The system of claim 5, wherein the etchant processing section comprises a chemical agent supply section for supplying a chemical agent.

8. The system of claim ~~5~~7, wherein the etchant processing section comprises a cavity for mixing and storing the chemical agent.

9. A method for removing materials from a semiconductor device structure comprising silicon nitride, comprising:

introducing an etchant into a processing chamber to remove a portion of the semiconductor device structure by etching silicon nitride from the semiconductor device and generating a by-product;

converting the by-product into a precipitate by providing a precipitation accelerator to react with the by-product; and

removing the precipitate, thereby removing the by-product continuously.

10. The method of claim 9, wherein converting the by-products into the precipitate comprises supplying a precipitation accelerator to the etchant.

11. The method of claim 9, wherein the removing the precipitate comprises filtering out the precipitate.

12. The method of claim 10, wherein the etchant comprises a phosphoric acid-containing solution.

13. The method of claim 10, wherein the portion of the substrate comprises silicon nitride.

14. The method of claim 10, wherein the precipitation accelerator comprises one or more of the following: hydrogen fluoride, water, amino acid, amine, silicates, or inorganic salt containing Ca, or Mg.

15. The method of claim 10, wherein the precipitation accelerator comprises a solid structure for the by-products to precipitate on.

16. A method for removing a material from a semiconductor device structure, comprising:

exposing a semiconductor device structure to a solution exhibiting a positive etch selectivity for the material; ~~and~~

removing the material chemically from the semiconductor device structure in such a way that the solution exhibits negative etch selectivity for silicon oxide;

wherein the material comprises silicon nitride;

converting the silicon nitride to a by-product; and

converting the by-product to a precipitate;

wherein said converting uses precipitation promoter; and

wherein said converting uses precipitation promoter includes hydrogen fluoride, amino acids, amines, silicates, or inorganic salts containing Ca, Mg.

~~17. The method of claim 16, wherein the material comprises silicon nitride.~~

~~18. The method of claim 17, further comprising converting the silicon nitride to a by-product.~~

~~19. The method of claim 18, further comprising converting the by-product to a precipitate.~~

~~20. The method of claim 19, further comprising removing the precipitate from the solution.~~