

CLAIMS

What is claimed is:

1. A method of cleaning a chamber surface to remove tin oxide therefrom, the method
5 comprising:
 exposing the chamber surface to a first plasma generated from a first plasma generation
 gas comprising a first reducing chemistry to reduce the tin oxide to tin; and
 exposing the chamber surface to a second plasma generated from a second plasma
 generation gas comprising a second reducing chemistry and organic additive
10 chemistry to remove the tin from the chamber surface.
2. The method of claim 1, wherein the first plasma generation gas further comprises an inert
gas.
3. The method of claim 2, wherein the inert gas comprises at least one gas selected from the
group consisting of helium, neon, argon, xenon, and nitrogen (N₂).
- 15 4. The method of claim 1, wherein a ratio of reducing chemistry:organic additive chemistry
in the second plasma generation gas is about 0.01 to about 100.
5. The method of claim 1, wherein at least one of the first reducing chemistry or the second
reducing chemistry comprises at least one species selected from the group consisting of
elemental hydrogen (H₂), ammonia (NH₃), diborane (B₂H₆), sulfur dioxide (SO₂), hydrazine
20 (N₂H₄), diisobutylaluminum hydride ((i-Bu₂AlH)₂), formic acid (HCOOH), carbon monoxide
(CO), a sulfite, an iodide, a phosphite, a hypophosphite, and a cyanide.
6. The method of claim 1, wherein the organic additive chemistry comprises at least one
species selected from the group consisting of an alkane, an alcohol, a carboxylic acid, and an
acetate.
- 25 7. The method of claim 5, wherein the first plasma generation gas is substantially free of
CH₄.
8. The method of claim 5, wherein the first plasma generation gas is substantially free of
carbon-containing species.
9. The method of any of claims 1-8, wherein the first plasma and the second plasma are
30 each capacitively coupled plasmas.

10. An apparatus for processing a substrate, the apparatus comprising:
- a processing chamber having a chamber surface on an interior of the processing chamber;
 - an inlet to the processing chamber for introducing reactants to the processing chamber;
 - an outlet to the processing chamber for removing species from the processing chamber;
 - 5 a plasma generator configured to provide plasma in the processing chamber; and
 - a controller configured to cause:
 - exposing the chamber surface to a first plasma generated from a first plasma generation gas comprising a first reducing chemistry to reduce tin oxide on the chamber surface to tin, and
 - 10 exposing the chamber surface to a second plasma generated from a second plasma generation gas comprising a second reducing chemistry and an organic additive chemistry to remove the tin from the chamber surface.