CLAIMS

1. A semiconductor processing apparatus for filling a high aspect ratio feature provided on a partially manufactured semiconductor substrate with tungsten, the apparatus comprising:

a processing chamber having one or more etching stations, said processing chamber configured to selectively remove a portion of a deposited layer of tungsten-containing material, said one or more etching stations comprising an etching heating element for controlling the temperature of the substrate during etching and a showerhead;

a plasma generator remote to the processing chamber configured to generate activated etching material, the remote plasma generator connected to a showerhead of the processing chamber; and

a controller comprising program instructions for selectively removing a portion of the deposited layer of tungsten-containing material including instructions for:

flowing a fluorine-containing gas into the plasma generator to generate a fluorine-containing plasma;

introducing the fluorine-containing plasma ~~activated etching material~~ to the ~~second~~ processing chamber a relative removal contribution of the activated species may exceed that of the recombined specie via the showerhead;

maintaining a temperature of the partially manufactured semiconductor substrate of less than about 250°C; and

maintaining a pressure of the processing chamber of less than 5 Torr.

2. The semiconductor processing apparatus any of claim 1, wherein the controller further comprises instructions for depositing the layer of tungsten-containing material on the partially manufactured semiconductor substrate via a chemical vapor deposition reaction between a tungsten-containing precursor and a reducing agent.

3. The semiconductor processing apparatus of claim 2, wherein the deposition and the selective removal operations are performed on different stations of a multi-station apparatus.

4. The semiconductor processing apparatus of claim 2, wherein the controller further comprises instructions for depositing a second layer of the tungsten-containing material on the partially manufactured semiconductor substrate via a chemical vapor deposition reaction between a tungsten-containing precursor and a reducing agent after the selective removal operation.