CLAIMS

1. A showerhead for use in a semiconductor processing apparatus, the showerhead comprising:

a stem having an inner diameter and an outer diameter;

a faceplate comprising a plurality of faceplate through-holes, the plurality of faceplate through-holes extending from a first side to a second side of the faceplate, wherein at least some of the faceplate through-holes have a diameter less than 0.04 inches;

a backplate opposite the faceplate to define a plenum volume between the faceplate and the backplate, wherein the stem is connected to the backplate at a central region of the backplate and in fluid communication with the plenum volume, wherein the backplate has an outer side and an inner side opposite the outer side, wherein the inner side of the backplate faces the plenum volume, wherein at least a portion of the outer side of the backplate is sloped from the central region to an edge region; and

a baffle positioned in the plenum volume, wherein the stem is configured to distribute process gases in the plenum volume that are flowed from the stem.

2. The showerhead of claim 1, wherein the baffle has a diameter greater than the inner diameter of the stem.

3. The showerhead of claim 1, wherein the baffle comprises a plurality of baffle through-holes.

4. The showerhead of claim 3, wherein a porosity of the baffle comprising the plurality of baffle through-holes is between 5% and 25%.

5. The showerhead of claim 1, wherein the baffle is centered underneath the stem in the plenum volume.

6. The showerhead of claim 1, wherein the faceplate through-holes are spatially distributed in hexagonal arrangements across a major surface of the faceplate.

7. The showerhead of claim 1, wherein the faceplate through-holes are spatially distributed in triangular arrangements across a major surface of the faceplate.

8. The showerhead of claim 1, wherein the plenum volume has a first surface and a second surface opposite the first surface, wherein the inner side of the faceplate defines the

first surface of the plenum volume and wherein the outer side of the backplate defines the second surface of the plenum volume.

9. The showerhead of claim 1, wherein the diameter of the at least some of the plurality of faceplate through-holes is between 0.01 inches and 0.03 inches.

10. The showerhead of claim 1, wherein a number of faceplate through-holes is between 300 and 6000 through-holes.

11. The showerhead of claim 1, wherein the diameter of the faceplate through-holes is configured to increase a spatial uniformity of a flow of the process gases coming out of the faceplate.

12. The showerhead of claim 1, wherein the diameter of the faceplate through-holes is configured to reduce backstreaming of plasma coming into the plenum volume from outside of the faceplate.

13. A semiconductor processing station, the semiconductor processing station comprising the showerhead of any one of claims 1-12.