CLAIMS

WHAT IS CLAIMED IS:

1. A plasma system, comprising:

a dielectric window, an area surrounded by the dielectric window defining a first chamber and the first chamber being configured to accommodate plasma;

a first adapter, arranged immediately under the dielectric window, and an area surrounded by the first adapter defining a second chamber;

a lower electrode platform placed in the second chamber, the lower electrode platform being used to carry a workpiece; and

a filter device, wherein

a filter member of the filter device is placed at an intersection of the first chamber and the second chamber, and the filter member has a plurality of through-holes configured to filter the plasma in the first chamber, such that the filtered plasma enters the second chamber;

a first extension member of the filter device extends from the filter member in a first direction and is placed over the first adapter;

the filter device has a second extension member at a position adjacent to the first extension member and extending in a second direction perpendicular to the first direction, the second extension member being arranged immediately adjacent to the first adapter and surrounding the second chamber to support the filter member.

2. The plasma system of claim 1, wherein the first extension member extends from the filter member in the first direction to form an annular structure.

3. The plasma system of claim 1, wherein the first extension member extends from the filter member in the first direction, and extends from an edge of the filter member to form a claw-shaped structure.

4. The plasma system of any one of claims 1-3, wherein the first extension member comprises a first lower surface and a second lower surface, wherein the first lower surface is arranged immediately over the first adapter, a position of the second lower surface in an axial direction is higher than a position of the first lower surface in the axial direction.

5. The plasma system of claim 4, wherein the first adapter is provided with a first gas passage through which reaction gas passes, and a second gas passage, through which the reaction gas passes, is formed between the second lower surface and the first adapter, wherein the reaction gas enters the first chamber after passing through the first gas passage and the second gas passage.

6. The plasma system of any one of claims 1-3, wherein in an axial direction, a thickness of the filter member is greater than a thickness of the first extension member.

7. The plasma system of any one of claims 1-3, wherein in an axial direction, a thickness of the filter member is less than or equal to a thickness of the first extension member.

8. The plasma system of any one of claims 1-3, wherein an upper surface of the first extension member is coplanar with an upper surface of the filter member.

9. The plasma system of claim 1, wherein the second extension member extends from the position adjacent to the first extension member in the second direction to form a barrel-shaped structure and surround the second chamber.

10. The plasma system of claim 1, wherein the first direction is a direction along a radial direction of the filter member and away from a center axis of the filter member, and the second direction is a downward direction along the center axis of the filter member.

11. The plasma system of claim 1, wherein the filter member has a same thickness in an axial direction.

12. The plasma system of claim 11, wherein ratios of depths to diameters of the plurality of through-holes of the filter device range from 2 to 20.

13. The plasma system of claim 12, wherein the ratios of the depths to the diameters of the plurality of through-holes of the filter device are 14.

14. The plasma system of claim 12, wherein the ratios of the depths to the diameters of the plurality of through-holes of the filter device are 10.

15. The plasma system of claim 12, wherein the ratios of the depths to the diameters of the plurality of through-holes of the filter device are 7.

16. The plasma system of claim 1, wherein a thickness of an edge portion of the filter member is greater than a thickness of a center portion of the filter member.

17. The plasma system of claim 16, ratios of depths to diameters of the plurality of through-holes of the filter device range from 12 to 30.

18. The plasma system of claim 16, wherein ratios of depths to diameters of the plurality of through-holes of the filter device range from 8.5 to 18.

19. The plasma system of claim 1, wherein a density of the plurality of through-holes of the filter device ranges from 0.7 through-hole/cm^2 to 3 through-holes/cm^2.

20. The plasma system of claim 1, wherein the dielectric window has a hemispherical shape.

21. The plasma system of claim 1, wherein the dielectric window has a barrel shape.

22. The plasma system of claim 21, further comprising:

a second adapter, the second adapter having an annular bottom, wherein the annular bottom is arranged immediately over the dielectric window;

a top cover arranged immediately over the second adapter, the top cover including a conductive material; and

a shield member, the shield member having an annular extension member, wherein the annular extension member is placed immediately over the annular bottom, and the shield member has a third extension member extending downward at an inner edge of the annular extension member, the third extension member being immediately adjacent to the dielectric window and surrounding the first chamber.

23. The plasma system of claim 1, wherein the filter device includes a conductive material.

24. The plasma system of claim 23, wherein the filter device includes aluminum.

25. A filter device applicable to a plasma system, wherein the plasma system includes a dielectric window and an adapter arranged immediately under the dielectric window, and an area surrounded by the dielectric window defines a first chamber, the first chamber is used to accommodate plasma, an area surrounded by the adapter defines a second chamber, and the plasma system further includes a lower electrode platform placed in the second chamber, the lower electrode platform is used to carry a workpiece, wherein a filter member of the filter device is placed at an intersection of the first chamber and the second chamber, and the filter member has a plurality of through-holes configured to filter the plasma in the first chamber, such that the filtered plasma enters the second chamber; a first extension member of the filter device extends from the filter member in a first direction and is placed over the adapter; the filter device has a second extension member at a position adjacent to the first extension member and extending in a second direction perpendicular to the first direction, the second extension member being arranged immediately adjacent to the adapter and surrounding the second chamber to support the filter member.