CLAIMS

1. A composite wick apparatus, the apparatus comprising:

a wick holder having a tubular section and a conical section, the tubular section having a hole formed therein along a long axis of the tubular section, the tubular section and the conical section each being formed from at least one material that is impervious to a working fluid;

a first porous material having a first pore density, the first porous material further having a first surface and an opposing second surface;

a second porous material in fluid communication with the first porous material and having a first surface with an area substantially the same as an area of the first surface of the first porous material, the first surface of the second porous material is substantially in contact with the first surface of the first porous material, the second porous material having a second pore density that is dissimilar to the first pore density, the first porous material and the second porous material are configured to provide vapor from the working fluid to a fluid-based particle counter, the first porous material and the second porous material configured to be placed within at least the tubular section of the wick holder.

2. The apparatus of claim 1, wherein the second porous material is concentric with the first porous material.

3. The apparatus of claim 1, wherein the opposing second surface of the first porous material is substantially in contact with an inner portion of the wick holder.

4. The apparatus of claim 1, wherein a longitudinal axis of the conical section is arranged along a longitudinal axis of the tubular section.

5. The apparatus of claim 1, wherein at least the second porous material extends partially into the conical section to enable condensed droplets of the working fluid to be absorbed by at least the second porous material.

6. The apparatus of claim 1, wherein the conical section has a surface texture on an inner surface of the conical section to prevent the working fluid from beading on the inner surface.

7. The apparatus of claim 1, wherein the conical section comprises a thermally-insulating material to provide a thermal barrier from the tubular section.

8. The apparatus of claim 1, wherein the first porous material comprises a sintered plastic material and the second porous material comprises a nylon membrane.

9. The apparatus of claim 1, wherein at least one of the first porous material and the second porous material comprise a hydrophilic material.

10. The apparatus of claim 1, wherein at least one of the first porous material and the second porous material comprise a hydrophobic material.

11. The apparatus of claim 1, wherein at least one of the first porous material and the second porous material comprise at least one material selected from materials including sintered metal and porous ceramic.

12. A composite wick apparatus, the apparatus comprising:

a first porous material layer having a first surface and an opposing second surface;

a second porous material layer in fluid communication with the first porous material layer, the second porous material layer having a first surface with an area substantially the same as an area of the first surface of the first porous material layer, the first surface of the second porous material layer being substantially in contact with the first surface of the first porous material layer and formed concentrically within the first porous material layer, the first porous material layer and the second porous material layer to provide vapor from a working fluid to a fluid-based particle counter, the first porous material and the second porous material configured to be placed within at least a tubular section of a wick holder, the tubular section having a hole formed therein along a long axis of the tubular section and formed from at least one material that is impervious to the working fluid.

13. The apparatus of claim 12, wherein the first porous material layer has a first pore density and the second porous material layer has a second pore density.

14. The apparatus of claim 12, wherein the first porous material layer has a first pore density and pore size distribution and the second porous material layer has a second pore density and pore size distribution, the first pore density and pore size distribution differs from the second pore density and pore size distribution.

15. The apparatus of claim 12, wherein at least one of the first porous material layer and the second porous material layer is substantially uniform in thickness.

16. The apparatus of claim 12, wherein at least one of the first porous material layer and the second porous material layer varies in thickness.

17. The apparatus of claim 12, wherein each of the first porous material layer and the second porous material layer comprise different materials.

18. The apparatus of claim 12, wherein each of the first porous material layer and the second porous material layer comprise the same material.

19. The apparatus of claim 12, wherein at least one of the first porous material layer and the second porous material layer have varying pore densities.

20. The apparatus of claim 12, wherein at least one of the first porous material layer and the second porous material layer have varying pore size distributions.

21. A wick apparatus comprising a plurality of porous material layers in fluid communication with and formed concentrically with one another, the plurality of porous material layers to provide vapor from a working fluid to a fluid-based particle counter, at least one of the plurality of porous material layers having median pore characteristic dimensions that are larger than median pore characteristic dimensions in at least some of remaining ones of the plurality of porous material layers, the plurality of porous material layers configured to be placed within at least a tubular section of a wick holder, the tubular section having a hole formed therein along a long axis of the tubular section and formed from at least one material that is impervious to the working fluid.

22. The wick apparatus of claim 21, wherein pore sizes in at least one of the

plurality of porous material layers has a characteristic dimension of less than about one micron.

23. The wick apparatus of claim 21, wherein pore sizes in at least one of the plurality of porous material layers has a characteristic dimension of greater than about one micron.

24. The wick apparatus of claim 21, wherein at least one of the plurality of porous material layers includes a surfactant material.

25. The wick apparatus of claim 21, wherein each of the plurality of porous material layers comprise a similar material.

26. The wick apparatus of claim 21, wherein at least some of the plurality of porous material layers comprise materials dissimilar from remaining ones of the plurality of porous material layers.

27. The wick apparatus of claim 21, wherein each of the plurality of porous material layers is selected from at least one material selected from materials including fibers or fibrous materials, woven materials, non-woven materials, sponge-like materials, fabrics, and glass-fibers.

28. A composite wick apparatus, the apparatus comprising:

a first porous material comprising a sintered material and having a first pore density, the first porous material further having a first surface and an opposing second surface;

a second porous material comprising a nylon membrane in fluid communication with the first porous material and having a first surface with an area substantially the same as an area of the first surface of the first porous material, the first surface of the second porous material is substantially in contact with the first surface of the first porous material, the second porous material having a second pore density that is dissimilar to the first pore density, the first porous material and the second porous material are configured to provide vapor from a liquid to a fluid-based particle counter.