CLAIMS

I/We claim:

1. A treatment module, comprising:

a housing having an input port and an output port;

a plurality of treatment members, each treatment member having a skeleton and a mesh material provided over the skeleton, the mesh material being joined to the skeleton at one or more portions of the skeleton; and

a layer of particles formed over a first side of the mesh material, the layer having pores of sufficient size to enable a fluid to flow through the layer.

2. The treatment module of claim 1, wherein the skeleton extends along a first direction, and the mesh material is flexible, and

wherein the skeleton is configured to prevent the mesh material from collapsing entirely inward when a force is applied inward to the mesh material.

3. The treatment module of claim 1, wherein the mesh material is joined to the skeleton at first and second ends of the skeleton.

4. The treatment module of claim 3, further comprising:

a first end piece joining the mesh material to the first end of the skeleton; and

a second end piece joining the mesh material to the second end of the skeleton.

5. The treatment module of claim 2, wherein the skeleton has an elongated shape along the first direction, and the mesh material has a tubular shape covering the skeleton.

6. The treatment module of claim 1, wherein the skeleton has an elongated shape along the first direction, and

wherein the skeleton includes a plurality of ribs, the ribs having a geometry that allows fluid to flow therethrough in parallel to and perpendicular to the first direction.

7. The treatment module of claim 6, wherein the skeleton further includes a rod held by the ribs, the rod providing a structural support for the skeleton along the first direction.

8. The treatment module of claim 1, wherein the mesh material is formed as a flat sheet over the skeleton.

9. The treatment module of claim 1, wherein each of the treatment members is configured to be removable from the housing.

10. The treatment module of claim 1, wherein the treatment members are bonded together at least on one end by potting.

11. A treatment member, comprising:

a skeleton including a plurality of ribs and optionally a stiffening rod and extending along a first direction, the rod providing a structural rigidity for the skeleton along the first direction; and

a flexible mesh tube provided around the skeleton and configured to fluctuate when forces are applied to the mesh tube.

12. The treatment member of claim 11, wherein the mesh tube is joined to the skeleton at first and second ends of the skeleton.

13. The treatment member of claim 11, wherein the skeleton has an elongated shape along the first direction, and wherein the skeleton includes a plurality of ribs, the ribs having a geometry that allows fluid to flow therethrough in parallel to and perpendicular to the first direction.

14. The treatment member of claim 13, wherein the skeleton further includes a rod held by the ribs, the rod providing a structural support for the skeleton along the first direction.

15. A method for operating a treatment module, the method comprising:

providing a plurality of a treatment members, each treatment member having a support structure and a mesh material provided over a first side of the support structure;

flowing a first fluid of a first type through the treatment members; and

flowing a second fluid of a second type through the treatment members, the first and second types being different fluid types,

wherein forces applied by the first and second fluids to the mesh material cause particles collected on the mesh material to be released from the mesh material.

16. The method of claim 15, wherein the method relates to cleaning the treatment module, and

wherein the mesh material is flexible and is configured to fluctuate or partially collapse and expand chaotically when the forces are applied to the mesh material by the first and second fluids.

17. The method of claim 16, further comprising:

flowing a third fluid of the first type through the treatment members; and

flowing a fourth fluid of the second type through the treatment members,

wherein the fluids of the first type are gas, and the fluids of the second type are liquid.

18. The method of claim 17, wherein the first and second fluids are flowed through the treatment members in a first direction, and the third and fourth fluids are flowed through the treatment members in a second direction that is substantially orthogonal to the first direction.

19. The method of claim 17, wherein each of the treatment members includes a layer formed on the mesh material, with the layer comprising contaminant-collecting particles, the method further comprising:

flowing a solution including contaminants through the treatment members, the layer of contaminant-collecting particles formed on the mesh material collecting the contaminants in the solution,

wherein the forces applied by the fluids cause the contaminants collected by the layer to be released from the mesh material.

20. The method of claim 15, wherein the support structure is a skeleton having a plurality of ribs and optionally a stiffening rod, the skeleton having an elongated shape extending along the first direction, and

wherein the mesh material covers the skeleton and has a tubular shape.