CLAIMS

The claims are as follows:

1. A method of distributing the flow of a fluid stream within a process unit, the method comprising:

passing the fluid stream through a plurality of structured elements in the process unit, each structured element comprising one or more interconnected unit cells, each unit cell having a frame with a three-dimensional polyhedron structure and a plurality of faces, wherein the faces comprise a mix of open faces, partially open faces and closed faces, and wherein the frame has a plurality of differently-shaped asperities disposed on the surfaces thereof; and

contacting the fluid stream with the contact surface as the fluid stream flows through the structured elements, such that the fluid steam is subdivided into substreams.

2. The method of claim 1, wherein the asperities comprise one or more of channels, flutes, spikes, fibrils and filaments.

3. A method of filtration of a fluid stream containing filterable solids in a process unit, the method comprising:

passing the fluid stream through a plurality of structured elements in the process unit, wherein each structured element comprises one or more interconnected unit cells, each unit cell having a frame with a three-dimensional polyhedron structure and a plurality of faces, and wherein the faces are either open, partially open or closed, and wherein the frame, the partially open faces, and the closed faces each have a plurality of differently-shaped asperities disposed on the surfaces thereof; and

contacting the fluid stream with the contact surface, wherein the contact surface filters from the fluid stream filterable solids having a size in the range from 100 nanometers to 11 millimeters.

4. The method of claim 3, wherein the fluid stream is an industrial process stream and the process unit is an industrial process unit.

5. The method of claim 1, wherein the structured elements comprise a plurality of differently-shaped unit cells.

6. The method of claim 3, wherein the structured elements comprise a plurality of differently-shaped unit cells.

7. The method of claim 1, wherein the asperities comprise one or more of fibrils and filaments.

8. The method of claim 3, wherein the asperities comprise one or more of fibrils and filaments.