

CLAIMS:

1. An asymmetric membrane comprising
 - (a) a first exterior porous surface;
 - (b) a second exterior porous surface;
 - (c) a porous bulk between the first exterior porous surface and the second exterior porous surface, the porous bulk having a first porous region and a second porous region, the first porous region contacting the second porous region;
 - (d) a first asymmetric porous zone, the first asymmetric porous zone including the first exterior porous surface, and extending into, and including, the first porous region of the bulk; and,
 - (e) a second asymmetric porous zone, the second asymmetric porous zone including the second exterior porous surface, and extending into, and including, the second porous region of the bulk;wherein the first asymmetric porous zone includes a first porous asymmetry that increases from the first exterior porous surface through the first porous region of the bulk, and the second asymmetric porous zone includes a second porous asymmetry that increases from the second exterior porous surface through the second porous region of the bulk, and the first exterior porous surface has a first average pore size and the second exterior porous surface has a second average pore size, wherein the first average pore size is larger than the second average pore size.
2. The membrane of claim 1, wherein the first asymmetric porous zone has a thickness of 10 μm to 500 μm .
3. The membrane of claim 1 or 2, wherein the second asymmetric porous zone has a thickness of 10 μm to 400 μm .

4. The membrane of any one of claims 1-3, wherein the membrane has a pore size ratio of 1.1 to 100.0.
5. The membrane of any one of claims 1-4, wherein the first asymmetric porous zone has an average pore size of 0.2 μm to 10.0 μm .
6. The membrane of any one of claims 1-5, wherein the second asymmetric porous zone has an average pore size of 0.01 μm to 5.0 μm .
7. The membrane of any one of claims 1-6, comprising a pleated membrane.

CLAIMS:

1. An asymmetric membrane comprising
 - (a) a first exterior porous surface;
 - (b) a second exterior porous surface;
 - (c) a porous bulk between the first exterior porous surface and the second exterior porous surface, the porous bulk having a first porous region and a second porous region, the first porous region contacting the second porous region;
 - (d) a first asymmetric porous zone, the first asymmetric porous zone including the first exterior porous surface, and extending into, and including, the first porous region of the bulk; and,
 - (e) a second asymmetric porous zone, the second asymmetric porous zone including the second exterior porous surface, and extending into, and including, the second porous region of the bulk;wherein the first asymmetric porous zone includes a first porous asymmetry that increases gradually from the first exterior porous surface through the first porous region of the bulk, and the second asymmetric porous zone includes a second porous asymmetry that increases gradually from the second exterior porous surface through the second porous region of the bulk, and the first exterior porous surface has a first average pore size and the second exterior porous surface has a second average pore size, wherein the first average pore size is larger than the second average pore size.
2. The membrane of claim 1, wherein the first asymmetric porous zone has a thickness of 10 μm to 500 μm .
3. The membrane of claim 1 or 2, wherein the second asymmetric porous zone has a thickness of 10 μm to 400 μm .

4. The membrane of any one of claims 1-3, wherein the membrane has a pore size ratio of 1.1 to 100.0.
5. The membrane of any one of claims 1-4, wherein the first asymmetric porous zone has an average pore size of 0.2 μm to 10.0 μm .
6. The membrane of any one of claims 1-5, wherein the second asymmetric porous zone has an average pore size of 0.01 μm to 5.0 μm .
7. The membrane of any one of claims 1-6, comprising a pleated membrane.