[0018] In another embodiment of the present invention, the invention is defined as a method for enhancing the rate of evaporation of liquid disposed on a surface which includes defining an exposed face of a film as a polymeric microstructure-bearing surface with a plurality of channels thereon, where the channels are defined by generally spaced apart projections with valleys therebetween. The method includes introducing a liquid onto the polymeric microstructure-bearing surface of the film, wherein the channels are formed to facilitate spontaneous wicking of the liquid along each channel which receives liquid therein so that the exposed evaporative active surface of the liquid is increased by its spatial distribution in the x-direction along the valley of each channel, its spatial distribution in the y-direction between the projections of each channel, as well as by forming meniscus height variations of the liquid in each channel in the z-direction. The method further includes exposing the increased evaporatively active surface area of the liquid on the microstructure-bearing surface to ambient air.

[0019] In a preferred embodiment, the inventive method includes exposing the liquid disposed on the microstructure-bearing surface to a moving air stream. Preferably, the inventive method further includes introducing a sufficient quantity of liquid onto the polymeric microstructure-bearing surface to define a continuous flow of liquid over the surface. Further, the inventive method may include collecting non-evaporative liquid that has flowed over the surface, and after further processing of the liquid, recirculating the liquid collected from the surface for reintroduction thereon. In a preferred embodiment, the method includes exposing at least a portion of the liquid flowing over the surface to a moving air stream, which may be moving in the generally opposite direction to the liquid flow direction across the surface. Alternatively, the air stream may be moving in a direction generally perpendicular to the direction that the liquid is flowing across the surface.

[0020] In alternate embodiments, the projections are ridges and/or may be discontinuous along the channels. In one embodiment, the polymeric microstructure-bearing surface has first and second ends, and the inventive method includes introducing the sufficient quantity of liquid onto the surface adjacent the first end thereof, and aligning the surface so that its first end is higher than its second end (e.g., the exposed face may be aligned on a generally vertical plane). The inventive method may further include defining additional surface texture features on the polymeric microstructure-bearing surface in order to increase the surface area thereon for supporting the liquid. In one preferred embodiment, the polymeric microstructure-bearing surface has generally parallel channels extending between first and second ends thereof, and the inventive method further includes aligning the surface so that one end of the channels is higher than the other end. Alternatively, the microstructure-bearing surface may be aligned so that an intermediate portion thereof is lower than its first and second ends. In a preferred embodiment, the inventive method further includes providing an additive in the polymeric microstructure-bearing surface, wherein the additive is selected from the group consisting of flame retardants, hydrophobics, hydrophylics, antimicrobial agents, inorganics, metallic particles, glass fibers, fillers, clays and nanoparticles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] **FIGS. 1***a* and **1***b* are schematic diagrams used to illustrate interaction of a liquid on a surface.

[0022] **FIGS. 2***a* through **2***k* are cross-sectional cutaway views of illustrative embodiments of fluid control films of the present invention.

[0023] **FIG. 3***a* is a perspective view of an active fluid transport device in accordance with the present invention which has a structured layer, a cap layer mounted over the structured layer to provide multiple discrete channels that are in communication with a vacuum source, and an adhesive layer bonding the structured layer to a substrate.

[0024] **FIG. 3***b* illustrates, in partial sectional view, a stacked arrangement of structured layers made according to the present invention.

[0025] **FIG. 4** is a prospective view of an alternative active fluid transport device in accordance with the present invention.

[0026] **FIG. 5** is a greatly enlarged sectional view of a portion of the active fluid transport device of **FIG. 4**.

[0027] **FIGS. 6***a* and **6***b* are plan views of structured layers illustrating alternative channel structures that may be used in an active fluid transport device in accordance with the present invention.

[0028] **FIG. 7***a* is a schematic illustration of an alternative active fluid transport device of the present invention.

[0029] **FIG. 7***b* is a plan view of the device of **FIG. 7***a*, with the cap layer partially broken away for illustrative purposes.

[0030] **FIG. 8***a* is a schematic illustration of an alternative active fluid transport device of the present invention.

[0031] **FIG. 8***b* is a plan view of the device of **FIG. 8***a*, with the cap layer partially broken away for illustrative purposes.

[0032] **FIG. 9** is a plan view similar to **FIG. 8***b*, with absorbent strips aligned between apertures, and with the cap layer partially broken away for illustrative purposes.

[0033] **FIG. 10** is a plan view similar to **FIG. 8***b*, with cross-channels formed between apertures, and with the cap layer partially broken away for illustrative purposes.

[0034] **FIG. 11** is a plan view of an alternative active fluid transport device of the present invention, employing a side fluid collection manifold, and with the cap layer partially broken away for illustrative purposes.

[0035] **FIG. 12***a* is schematic illustration of a test assembly used for evaluating the collection and removal attributes of the present invention.

[0036] **FIG. 12***b* is a schematic plan view of the test assembly of **FIG. 12***a*.

[0037] **FIG. 13** is a perspective view of a test assembly for evaluating the evaporative attributes of the present invention.

[0038] **FIG. 14** is a graph of tested evaporation rates.

[0039] **FIG. 15** is a graph of tested evaporation rates.