at the interfaces of the structured packing layers and reduces the pressure drop that would otherwise be present at the interfaces if the curved geometry is not used.

SUMMARY

[0012] In one aspect, the present invention is directed to a structured packing module comprising a plurality of structured packing sheets positioned in an upright, parallel relationship to each other and a surface texturing on the structured packing sheets. Each structured packing sheet comprises: opposite faces; an upper edge and a lower edge; a lower edge region that is adjacent the lower edge; a bulk region above the lower edge region; a plurality of apertures that extend through the structured packing sheet; and corrugations formed of alternating peaks and valleys that are interconnected by corrugation sidewalls and extend in an inclined direction that forms an inclination angle in relation to the upper edge and/or the lower edge of the structured packing sheet. The structured packing sheets are constructed and arranged such that the corrugations of adjacent ones of the structured packing sheets cross at an angle to each other. Each structured packing sheet further includes a curve formed in the geometry of the corrugations in the lower edge region such that an inclination angle of the corrugations in relation to the lower edge gradually increases from the bulk region through the lower edge region. The surface texturing on the structured packing sheets comprises a grid of indented and raised structures in the bulk region with each indented structure being separated from some or all of adjacent ones of the indented structures by the raised structures, the raised structures forming rows of peaks and interconnecting saddles; and microchannels that extend along adjacent ones of the indented structures and the interconnecting saddles that are positioned between each of the adjacent ones of the indented structures.

[0013] In another aspect, the present invention is directed to a structured packing sheet comprising: opposite faces; an upper edge and a lower edge; a lower edge region that is adjacent

the lower edge; a bulk region above the lower edge region; a plurality of apertures that extend through the structured packing sheet; corrugations formed of alternating peaks and valleys that are interconnected by corrugation sidewalls and extend in an inclined direction that forms an inclination angle in relation to the upper edge and/or the lower edge of the structured packing sheet; a curve formed in the geometry of the corrugations in the lower edge region such that an inclination angle of the corrugations in relation to the lower edge gradually increases from the bulk region through the lower edge region; and surface texturing on the opposite faces. The surface texturing comprises a grid of indented and raised structures with each indented structure being separated from some or all of adjacent ones of the indented structures by the raised structures, the raised structures forming rows of peaks and interconnecting saddles; and microchannels that extend along adjacent ones of the indented structures and the interconnecting saddles that are positioned between each of the adjacent ones of the indented structures.

[0014] In a further aspect, the present invention is directed to a structured packing sheet comprising: opposite faces; an upper edge and a lower edge; a lower edge region that is adjacent the lower edge, wherein the lower edge region spans 25 to 45 percent of a distance from the lower edge to the upper edge of the structured packing sheet; a bulk region above the lower edge region; a plurality of apertures that extend through the structured packing sheet; corrugations formed of alternating peaks and valleys that are interconnected by corrugation sidewalls and extend in an inclined direction that forms an inclination angle in relation to the upper edge and/or the lower edge of the structured packing sheet; a curve formed in the geometry of the corrugations in the lower edge region such that an inclination angle of the corrugations in relation to the lower edge gradually increases from the bulk region through the lower edge region with the inclination angle at the lower edge being in the range of 65 to 90 degrees; and surface texturing on the opposite faces. The surface texturing comprises a grid of indented and raised structures with each indented structure being separated from some or all of adjacent ones of the indented structures by the raised structures, the

raised structures forming rows of peaks and interconnecting saddles; and microchannels that extend along adjacent ones of the indented structures and the interconnecting saddles that are positioned between each of the adjacent ones of the indented structures, wherein the indented structures are arranged in parallel rows with the interconnecting saddles of the raised structures connecting adjacent indented structures within each row.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In the accompanying drawings that form part of the specification and in which like numbers are used to indicate like components in the various views:

[0016] Fig. 1 is a fragmentary side elevation view of a mass transfer column with the column shell taken in vertical section to show four structured packing layers of the present invention positioned in a stacked arrangement within the mass transfer column;

[0017] Fig. 2 is a front perspective view of a corrugated structured packing sheet of the present invention that forms a portion of a structured packing module and has apertures and an embodiment of a surface texturing that comprises a grid of indented and raised structures, wherein the surface texturing is representationally shown covering only certain portions of the sheet for ease of viewing and understanding, but which may, in fact, cover the entire sheet;

[0018] Fig. 3 is an enlarged fragmentary view of a structured packing sheet having one embodiment of a surface texturing that comprises a grid of indented and raised structures in the form of cone-shaped peaks and valleys;

[0019] Fig. 3a is a cross-sectional view along line 3a-3a of Fig. 3;

[0020] Fig. 3b is a cross-sectional view along line 3b-3b of Fig. 3;

[0021] Fig. 4 is an enlarged fragmentary view of a structured packing sheet having another embodiment of surface texturing that comprises a grid of indented and raised structures in the form of elongated ridge-shaped peaks and valleys;

[0022] Fig. 4a is a cross-sectional view along line 4a-4a of Fig. 4;