CLAIMS

1. A composite sheet comprising a nonwoven-fabric-like fiber aggregation, and a mesh sheet or a thermally bonded non-woven fabric as a framework material, the fiber aggregation is integrated to one or both sides of the mesh sheet or the thermally bonded non-woven fabric in a state in which fibers forming the fiber aggregation are entangled with each other and with the framework material,

the composite sheet being formed into a three-dimensional uneven shape so as to have a plurality of protrusions and recesses,

the constituent fibers of the fiber aggregation being raised from the surfaces of the protrusions and the recesses,

a ratio of a number of the constituent fibers which are raised from the surfaces of the recesses and have a height of 1 mm or more to a number of the constituent fibers which are raised from the surfaces of the recesses and have a height of 0.1 mm or more being 25% or more, and

an average height of the constituent fibers raised from surfaces of the recesses is higher than an average height of the constituent fibers raised from surfaces of the protrusions.

2. The composite sheet according to claim 1, wherein a ratio (h3/h2) of the average height (h3) of the constituent fibers raised in the recesses to the average height (h2) of the constituent fibers raised in the protrusions is 3 or less.

3. The composite sheet according to claim 1 or 2, wherein the average height of the constituent fiber raised in the recess is from 0.5 to 30 mm, and the number of the constituent fibers raised in the recess is from 5 to 80 fibers/10 mm width.

4. The composite sheet according to any one of claims 1 to 3, wherein a material forming the framework material has the lowest melting point among the fiber materials forming the composite sheet.

5. The composite sheet according to any one of claims 1 to 4, wherein the fiber aggregation is formed by mixing two or more kinds of constituent fibers whose

diameters differ from others by double or more.

6. The composite sheet according to any one of claims 1 to 5, which is used for a cleaning sheet.

7. The composite sheet according to any one of claims 1 to 6, wherein a ratio (h3/h2) of the average height (h3) of the constituent fibers raised in the recesses to the average height (h2) of the constituent fibers raised in the protrusions is 2 or less.

8. The composite sheet according to any one of claims 1 to 7, wherein a ratio of the constituent fibers raised in the recesses and having a raising height of 1 mm or more to the constituent fibers raised in the recesses is from 30 to 95%, and

a ratio of the constituent fibers raised in the protrusions and having a raising height of 1 mm or more to the constituent fibers raised in the protrusions is from 20 to 90%.

9. The composite sheet according to any one of claims 1 to 8, wherein the constituent fibers raised include fibers raised in the state in which a fiber end protrudes, and loop-shaped fibers raised, and

a ratio of the loop-shaped fibers raised to the constituent fiber raised is from 2 to 70%.

10. A method for manufacturing the composite sheet according to claim 1, comprising:

performing a fiber-raising processing in which the constituent fibers of the composite sheet are raised; and then

subjecting a plurality of parts of the composite sheet which has been subjected to the fiber-raising processing to an uneven shape-providing processing so that a plurality of protrusions and recesses are formed on the composite sheet.

11. The method for manufacturing the composite sheet according to claim 10, wherein

the fiber-raising processing is performed using a protrusion roll having a plurality of protrusions on its peripheral surface, and

the composite sheet is supplied to the protrusion roll and the constituent fibers of the fiber aggregation which forms the composite sheet are raised.

12. The method for manufacturing the composite sheet according to claim 10 or 11, wherein

the uneven shape-providing processing is performed using a pair of uneven rolls,

one roll of the uneven rolls has a plurality of protrusions on its peripheral surface, and the other roll of the uneven rolls has a plurality of recesses, into which the protrusions of the former roll are inserted, at locations corresponding to the protrusions of the former roll on its peripheral surface,

a space is formed between the apex part of the protrusion on the one roll and the bottom part of the recess in the other roll, and

the composite sheet which has been subjected to the fiber-raising processing is supplied to between a pair of the uneven rolls, and uneven shapes are provided to a plurality of parts of the composite sheet which has been subjected to the fiber-raising processing.

13. A cleaning sheet comprising a fiber aggregation and a support supporting the fiber aggregation, constituent fibers of the fiber aggregation being entangled with each other and with the support, thereby forming a state in which the fiber aggregation is integrally entangled with the support, wherein

there are fiber ends of the constituent fibers having a length of 10 mm or longer, which formed by a fiber-raising treatment, more outward than a straight line joining contours of one surface of the cleaning sheet in a side view of the cleaning sheet.

14. The cleaning sheet according to claim 13, wherein there are 10 or more fiber ends per 10 cm^2 surface of the cleaning sheet.

15. The cleaning sheet according to claim 13 or 14, wherein the fiber aggregation is formed by hydroentanglement process.

16. The cleaning sheet according to any one of claims 13 to 15, wherein one surface of the cleaning sheet has unevenness having protrusions and recesses.

17. The cleaning sheet according to claim 16, wherein the protrusion has more fiber ends than the recess.

18. The cleaning sheet according to claim 16 or 17, wherein the protrusions and the recesses are formed by hydroentanglement process, which is subjected to the fiber aggregation.

CLAIMS

1. A composite sheet comprising a nonwoven-fabric-like fiber aggregation, and a mesh sheet or a thermally bonded non-woven fabric as a framework material, the fiber aggregation is integrated to one or both sides of the mesh sheet or the thermally bonded non-woven fabric in a state in which fibers forming the fiber aggregation are entangled with each other and with the framework material,

the composite sheet being formed into a three-dimensional uneven shape so as to have a plurality of protrusions and recesses,

the constituent fibers of the fiber aggregation being raised from the surfaces of the protrusions and the recesses,

a ratio of a number of the constituent fibers which are raised from the surfaces of the recesses and have a height of 1 mm or more to a number of the constituent fibers which are raised from the surfaces of the recesses and have a height of 0.1 mm or more being 25% or more, and

an average height of the constituent fibers raised from surfaces of the recesses is higher than an average height of the constituent fibers raised from surfaces of the protrusions.

2. The composite sheet according to claim 1, wherein a ratio (h3/h2) of the average height (h3) of the constituent fibers raised in the recesses to the average height (h2) of the constituent fibers raised in the protrusions is 3 or less.

3. The composite sheet according to claim 1 or 2, wherein the average height of the constituent fiber raised in the recess is from 0.5 to 30 mm, and the number of the constituent fibers raised in the recess is from 5 to 80 fibers/10 mm width.

4. The composite sheet according to any one of claims 1 to 3, wherein a material forming the framework material has the lowest melting point among the fiber materials forming the composite sheet.

5. The composite sheet according to any one of claims 1 to 4, wherein the fiber aggregation is formed by mixing two or more kinds of constituent fibers whose

diameters differ from each other by double or more.

6. The composite sheet according to any one of claims 1 to 5, which is used for a cleaning sheet.

7. The composite sheet according to any one of claims 1 to 6, wherein a ratio (h3/h2) of the average height (h3) of the constituent fibers raised in the recesses to the average height (h2) of the constituent fibers raised in the protrusions is 2 or less.

8. The composite sheet according to any one of claims 1 to 7, wherein a ratio of the constituent fibers raised in the recesses and having a raising height of 1 mm or more to the constituent fibers raised in the recesses is from 30 to 95%, and

a ratio of the constituent fibers raised in the protrusions and having a raising height of 1 mm or more to the constituent fibers raised in the protrusions is from 20 to 90%.

9. The composite sheet according to any one of claims 1 to 8, wherein the constituent fibers raised include fibers raised in the state in which a fiber end protrudes, and loop-shaped fibers raised, and

a ratio of the loop-shaped fibers raised to the constituent fiber raised is from 2 to 70%.

10. A method for manufacturing the composite sheet according to claim 1, comprising:

performing a fiber-raising processing in which the constituent fibers of the composite sheet are raised; and then

subjecting a plurality of parts of the composite sheet which has been subjected to the fiber-raising processing to an uneven shape-providing processing so that a plurality of protrusions and recesses are formed on the composite sheet.

11. The method for manufacturing the composite sheet according to claim 10, wherein

the fiber-raising processing is performed using a protrusion roll having a plurality of protrusions on its peripheral surface, and

the composite sheet is supplied to the protrusion roll and the constituent fibers of the fiber aggregation which forms the composite sheet are raised.

12. The method for manufacturing the composite sheet according to claim 10 or 11, wherein

the uneven shape-providing processing is performed using a pair of uneven rolls,

one roll of the uneven rolls has a plurality of protrusions on its peripheral surface, and the other roll of the uneven rolls has a plurality of recesses, into which the protrusions of the former roll are inserted, at locations corresponding to the protrusions of the former roll on its peripheral surface,

a space is formed between the apex part of the protrusion on the one roll and the bottom part of the recess in the other roll, and

the composite sheet which has been subjected to the fiber-raising processing is supplied to between a pair of the uneven rolls, and uneven shapes are provided to a plurality of parts of the composite sheet which has been subjected to the fiber-raising processing.