CLAIMS

1. A method of producing a foam having improved cellular consistency, comprising the steps of:

adding kinetic mixing particles having irregular surface characteristics to foam constituent fluids;

mixing said foam constituent fluids;

rotating said kinetic mixing particles to produce low energy surface regions inside said foam constituent fluids;

expanding said foam constituent fluids to form a foam defining a plurality of foam voids.

2. The method according to claim 1 wherein:

said irregular surface characteristics are selected from the group consisting of sharp points, thin blades, internal particle void angles less than 180°, external angles less than 180°, rough edges, smooth edges, spine like structures, protruding arms and conglomerations that incorporate one or more of these surface characteristics.

3. The method according to claim 1 wherein:

said irregular surface characteristics are conglomerations having a shape selected from the group consisting of protruding arms that are conglomerated together in various shapes such as cylinders, rectangles, cues, Y-shaped particles, X-shaped particles, octagons, pentagon, triangles, diamonds.

4. The method according to claim 1 wherein:

when said kinetic mixing particles are no longer rotating, said kinetic mixing particles form nucleation points adjacent to said irregular surface characteristics.

5. The method according to claim 1 further comprising a step of:

selecting an average size of said kinetic mixing particles to select a desired average size of said void in said foam.

6. The method according to claim 5 wherein:

said desired size of said foam void in said foam has a diameter that is approximately 0.025 to 8 times the average diameter of said kinetic mixing particles.

7. The method according to claim 1 wherein:

said kinetic mixing particles are selected from the group consisting of consisting of type I, type II, type III, type IV, type V, and type VI.

8. The method according to claim 1 wherein:

said kinetic mixing particles are comprised of perlite.

9. The method according to claim 8 wherein said perlite is solid.

10. The method according to claim 8 wherein said perlite is expanded.

11. The method according to claim 1 wherein:

said kinetic mixing particles have a hardness of at least 2.5 on the Mohs hardness scale.

12. A foam comprising:

expanded mixed foam constituent fluids defining voids therein;

kinetic mixing particles mixed into said foam constituent fluids, said kinetic mixing particles having irregular surface characteristics defining sharp blade-like surfaces.

13. The foam according to claim 12 wherein:

said foam voids of said foam have an average diameter of 12.5 nm to 240 µ.

The claimed void size range is supported at least at page 14, lines 18-22, which states, "A general rule of thumb is that the desired bubble size, i.e., foam void size, is expected to be from 0.025 to 8 times larger than the particle size diameter and/or of a protruding arm of a particle"; and page 3, lines 5-7, which states, "In particular, the size ranges of the particles are preferably from approximately 500 nm to 1µ, and more preferably, from 1µ to 30µ." The lower end of the void size is calculated as (0.025)(500 nm) = 12.5 nm. The upper end of the void size is calculated as (8)(30µ) = 240µ.

14. The foam according to claim 12 wherein:

said kinetic mixing particles are selected from the group consisting of type I, type II, type III, type IV, type V, and type VI.

15. The foam according to claim 12 wherein:

said kinetic mixing particles are comprised of perlite.

16. The foam according to claim 15 wherein said perlite is solid.

17. The foam according to claim 15 wherein said perlite is expanded.

18. The foam according to claim 12 wherein:

said irregular surface characteristics are selected from the group consisting of sharp points, thin blades, internal particle void angles less than 180°, external angles less than 180°, rough edges, smooth edges, spine like structures, protruding arms.

19. The foam according to claim 12 wherein:

said irregular surface characteristics are conglomerations having a shape selected from the group consisting of protruding arms that are conglomerated together in various shapes such as cylinders, rectangles, cues, Y-shaped particles, X-shaped particles, octagons, pentagon, triangles, diamonds.

20. The method according to claim 12 wherein:

said kinetic mixing particles have a hardness of at least 2.5 on the Mohs hardness scale.

21. The foam according to claim 12 wherein:

said foam constituent fluids are plastic.

22. The foam according to claim 12 wherein:

said substantially all of said particles have a size of less than approximately 50 microns.

23. A foam comprising:

expanded mixed foam constituent fluids defining voids therein;

kinetic mixing particles mixed into said foam constituent fluids, said kinetic mixing particles having irregular surface characteristics defining sharp blade-like surfaces;

wherein said voids have an average diameter of approximately 12.5nm to 240µ;

wherein substantially all of said particles have a size of less than approximately 50 microns.

CLAIMS

1. A method of producing a foam having improved cellular consistency, comprising the steps of:

adding kinetic mixing particles having sharp irregular surface characteristics and internal void angles less than 180° to foam constituent fluids;

mixing said foam constituent fluids;

rotating said kinetic mixing particles to produce low energy surface regions inside said foam constituent fluids;

expanding said foam constituent fluids to form a foam defining a plurality of foam voids;

wherein substantially all of said particles have a size of less than approximately 50μ.

2. The method according to claim 1 wherein:

said irregular surface characteristics are selected from the group consisting of sharp points, thin blades, internal particle void angles less than 180°, external angles less than 180°, rough edges, smooth edges, spine like structures, protruding arms and conglomerations that incorporate one or more of these surface characteristics.

3. The method according to claim 1 wherein:

said irregular surface characteristics are conglomerations having a shape selected from the group consisting of protruding arms that are conglomerated together in various

shapes such as cylinders, rectangles, cubes, Y-shaped particles, X-shaped particles, octagons, pentagon, triangles, diamonds.

4. The method according to claim 1 wherein:

when said kinetic mixing particles are no longer rotating, said kinetic mixing particles form nucleation points adjacent to said irregular surface characteristics.

5. The method according to claim 1 further comprising a step of:

selecting an average size of said kinetic mixing particles to select a desired average size of said void in said foam.

6. The method according to claim 5 wherein:

said desired size of said foam void in said foam has a diameter that is approximately 0.025 to 8 times the average diameter of said kinetic mixing particles.

7. The method according to claim 1 wherein:

said kinetic mixing particles are comprised of perlite.

8. The method according to claim 7 wherein said perlite is solid.

9. The method according to claim 7 wherein said perlite is expanded.

10. The method according to claim 1 wherein:

said kinetic mixing particles have a hardness of at least 2.5 on the Mohs hardness scale.

11. A foam comprising:

expanded mixed foam constituent fluids defining voids therein;

kinetic mixing particles in said expanded foam, said kinetic mixing particles having sharp irregular surface characteristics and internal void angles less than 180°;

wherein substantially all of said particles have a size of less than approximately 50µ.

12. The foam according to claim 11 wherein:

said foam voids of said foam have an average diameter of 12.5 nm to 240 µ.

13. The foam according to claim 11 wherein:

said kinetic mixing particles are comprised of perlite.

14. The foam according to claim 13 wherein said perlite is solid.

15. The foam according to claim 13 wherein said perlite is expanded.

16. The foam according to claim 11 wherein:

said irregular surface characteristics are selected from the group consisting of sharp points, thin blades, internal particle void angles less than 180°, external angles less than 180°, rough edges, smooth edges, spine like structures, protruding arms.

17. The foam according to claim 11 wherein:

said irregular surface characteristics are conglomerations having a shape selected from the group consisting of protruding arms that are conglomerated together in various

shapes such as cylinders, rectangles, cubes, Y-shaped particles, X-shaped particles, octagons, pentagon, triangles, diamonds.

18. The foam according to claim 11 wherein:

said kinetic mixing particles have a hardness of at least 2.5 on the Mohs hardness scale.

19. The foam according to claim 11 wherein:

said foam constituent fluids are comprised of a polymer.

20. A foam comprising:

expanded mixed foam constituent fluids defining voids therein;

kinetic mixing particles mixed into said foam constituent fluids, said kinetic mixing particles having irregular surface characteristics defining sharp blade-like surfaces;

wherein said voids have an average diameter of approximately 12.5nm to 240µ;

wherein substantially all of said particles have a size of less than approximately 50 microns.