CLAIMS

1. An inorganic fiber comprising the fiberization product of 70 or greater weight percent silica, magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 4 weight percent alumina, wherein said inorganic fiber exhibits a shrinkage of 10% or less at 1400°C.

2. The inorganic fiber of claim 1, wherein said inorganic fiber has an average diameter of greater than 4 microns.

3. The inorganic fiber of claim 2, wherein said inorganic fiber exhibits a shrinkage of 5% or less at 1400°C.

4. The inorganic fiber of claim 3, wherein said inorganic fiber exhibits a shrinkage of 4% or less at 1400°C.

5. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 70 to about 80 weight percent silica, about 15 to about 25 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 3 weight percent alumina.

6. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 70 to about 80 weight percent silica, about 15 to about 25 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, and 1 weight percent or less calcia.

7. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 70 to about 80 weight percent silica, about 15 to about 25 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, and substantially no alkali metal oxide.

8. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 70 to about 80 weight percent silica, about 15 to about 25 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

9. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 22 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 3 weight percent alumina.

10. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 27 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, and 1 weight percent or less calcia.

11. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 27 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, and substantially no alkali metal oxide.

12. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 27 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

13. The inorganic fiber of claim 3, wherein said present inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 27 weight percent magnesia, from about 5 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 2 weight percent alumina.

14. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 27 weight percent magnesia, from about 5 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 2 weight percent alumina, and 1 weight percent or less calcia.

15. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 72 to about 80 weight percent silica, about 17 to about 27 weight percent magnesia, from about 5 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

16. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 72 to about 86 weight percent silica, about 12.5 to about 26.5 weight percent magnesia, 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and 0 to about 3 weight percent alumina.

17. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 72 to about 86 weight percent silica, about 12.5 to about 26.5 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina and 1 percent or less of calcia.

18. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 72 to about 86 weight percent silica, about 12.5 to about 26.5 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, 1 percent or less of calcia, and substantially no alkali metal oxide.

19. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 75 to about 79 weight percent silica, about 15 to about 20 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 3 weight percent alumina.

20. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 75 to about 79 weight percent silica, about 15 to about 20 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, and 1 weight percent or less calcia.

21. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 75 to about 79 weight percent silica, about 15 to about 20 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, and substantially no alkali metal oxide.

22. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of about 75 to about 79 weight percent silica, about 15 to about 20 weight percent magnesia, 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to about 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

23. The inorganic fiber of claim 1, wherein said fiberization product further includes a viscosity modifier.

24. The inorganic fiber of claim 23, wherein said viscosity modifier is selected from the group consisting of alkali metal oxides, boria, and mixtures thereof.

25. The inorganic fiber of claim 24, wherein said viscosity modifier comprises boria.

26. A method for preparing the inorganic fiber exhibiting a shrinkage of 10% or less at 1400°C comprising:

forming a melt with ingredients comprising 70 or greater weight percent silica, magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 4 weight percent alumina; and

producing fibers from the melt.

27. The method of claim 26, wherein said melt of ingredients comprises about 72 to about 86 weight percent silica, about 12.5 to about 26.5 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and 0 to about 3 weight percent alumina.

28. A method of insulating an article, including disposing on, in, near or around the article, a thermal insulation material, said insulation material comprising the fiberization product of claim 1.

29. An inorganic fiber containing article comprising at least one of bulk fiber, blankets, needled blankets, papers, felts, cast shapes, vacuum cast forms, or compositions, said fiber containing article comprising the fiberization product of claim 1.

30. An inorganic fiber comprising the fiberization product of about 65 to about 86 weight percent silica, about 14 to about 35 weight percent magnesia, greater than 0 to about 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to about 4 weight percent alumina, wherein the fiber has an average fiber diameter of 4 microns and greater, and wherein said inorganic fiber exhibits a shrinkage of 5% or less at 1400°C.

CLAIMS

1. An inorganic fiber comprising the fiberization product of 70 or greater weight percent silica, 12.5 to 35 weight percent magnesia, an intended addition of an iron oxide bearing raw material in an amount of greater than 0 to 10 weight percent, measured as Fe_2O_3, and greater than 0 to 4 weight percent alumina, wherein said inorganic fiber exhibits a shrinkage of 10% or less at 1400°C.

2. The inorganic fiber of claim 1, wherein said inorganic fiber has an average diameter of greater than 4 microns.

3. The inorganic fiber of claim 2, wherein said inorganic fiber exhibits a shrinkage of 5% or less at 1400°C.

4. The inorganic fiber of claim 3, wherein said inorganic fiber exhibits a shrinkage of 4% or less at 1400°C.

5. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 70 to 80 weight percent silica, 15 to 25 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to 3 weight percent alumina.

6. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 70 to 80 weight percent silica, 15 to 25 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, and 1 weight percent or less calcia.

7. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 70 to 80 weight percent silica, 15 to 25 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, and substantially no alkali metal oxide.

8. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 70 to 80 weight percent silica, 15 to 25 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

9. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 22 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to 3 weight percent alumina.

10. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 27 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, and 1 weight percent or less calcia.

11. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 27 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, and substantially no alkali metal oxide.

12. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 27 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

13. The inorganic fiber of claim 3, wherein said present inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 27 weight percent magnesia, from 5 to 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to 2 weight percent alumina.

14. The inorganic fiber of claim 3, wherein said inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 27 weight percent magnesia, from 5 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 2 weight percent alumina, and 1 weight percent or less calcia.

15. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 72 to 80 weight percent silica, 17 to 27 weight percent magnesia, from 5 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

16. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 72 to 86 weight percent silica, 12.5 to 26.5 weight percent magnesia, 0 to 10 weight percent iron oxide, measured as Fe_2O_3, and 0 to 3 weight percent alumina.

17. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 72 to 86 weight percent silica, 12.5 to 26.5 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina and 1 percent or less of calcia.

18. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 72 to 86 weight percent silica, 12.5 to 26.5 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, 1 percent or less of calcia, and substantially no alkali metal oxide.

19. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 75 to 79 weight percent silica, 15 to 20 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, and greater than 0 to 3 weight percent alumina.

20. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 75 to 79 weight percent silica, 15 to 20 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, and 1 weight percent or less calcia.

21. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 75 to 79 weight percent silica, 15 to 20 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, and substantially no alkali metal oxide.

22. The inorganic fiber of claim 1, wherein said inorganic fiber comprises the fiberization product of 75 to 79 weight percent silica, 15 to 20 weight percent magnesia, 0 to 10 weight percent iron oxide, measured as Fe_2O_3, greater than 0 to 3 weight percent alumina, 1 weight percent or less calcia, and substantially no alkali metal oxide.

23. The inorganic fiber of claim 1, wherein said fiberization product further includes a viscosity modifier.

24. The inorganic fiber of claim 23, wherein said viscosity modifier is selected from the group consisting of alkali metal oxides, boria, and mixtures thereof.

25. The inorganic fiber of claim 24, wherein said viscosity modifier comprises boria.

26. A method for preparing the inorganic fiber exhibiting a shrinkage of 10% or less at 1400°C comprising:

forming a melt with ingredients comprising 70 or greater weight percent silica, 12.5 to 35 weight percent magnesia, an intended addition of an iron oxide bearing raw material in an amount of greater than 0 to 10 weight percent, measured as Fe_2O_3, and greater than 0 to 4 weight percent alumina; and

producing fibers from the melt.

27. The method of claim 26, wherein said melt of ingredients comprises 72 to 86 weight percent silica, 12.5 to 26.5 weight percent magnesia, greater than 0 to 10 weight percent iron oxide, measured as Fe_2O_3, and 0 to 3 weight percent alumina.

28. A method of insulating an article, including disposing on, in, near or around the article, a thermal insulation material, said insulation material comprising the fiberization product of claim 1.

29. An inorganic fiber containing article comprising at least one of bulk fiber, blankets, needled blankets, papers, felts, cast shapes, vacuum cast forms, or compositions, said fiber containing article comprising the fiberization product of claim 1.

30. An inorganic fiber comprising the fiberization product of 65 to 86 weight percent silica, 14 to 35 weight percent magnesia, an intended addition of an iron oxide bearing raw material in an amount of greater than 0 to 10 weight percent, measured as Fe_2O_3, and greater than 0 to 4 weight percent alumina, wherein the fiber has an average fiber diameter of 4 microns and greater, and wherein said inorganic fiber exhibits a shrinkage of 5% or less at 1400°C.