CLAIMS

What is claimed is:

1. A method of forming a vitrified superabrasive product, the method comprising:

providing a mixture including a glass powder, a suberabrasive grit, and silicon carbide; and

heating the mixture such that the silicon carbide acts as a foaming agent to form pores of the vitrified superabrasive product.

2. The method of claim 1, further comprising forming a green body that includes the glass powder, the superabrasive grit, and the silicon carbide.

3. The method of claim 2, wherein the green body includes a binder.

4. The method of claim 1, wherein the mixture is heated at a temperature in a range of between about 600°C to 820°C.

5. The method of claim 1, wherein the mixture is heated for a period of time in a range of about one-half hour to about 10 hours.

6. The method of claim 1, wherein heating the mixture produces a fired product and the method further comprises cooling the fired product to form the vitrified superabrasive product.

7. The method of claim 1, wherein the superabrasive grit includes a diamond particulate.

8. The method of claim 1, wherein the superabrasive grit has an average particle size in a range of between about 0.5 μm and about 60 μm.

9. The method of claim 1, wherein a volume ratio of superabrasive grit to glass powder is in a range of between about 3:2 and about 1:99.

10. The method of claim 1, wherein the silicon carbide is present in the form of particles having a number average particle size in a range of between about 0.1 microns and about 20 microns.

11. The method of claim 3, wherein the silicon carbide is present in the mixture in an amount in a range of between about 0.1 and about 5 volume percent of the total amount of glass powder, abrasive grit, binder and silicon carbide components of the mixture.

12. The method of claim 1, wherein the glass powder includes at least one member selected from the group consisting of silicon dioxide (SiO_2), boron oxide (B_2O_3), aluminum oxide (Al_2O_3), alkali oxides (Li_2O, Na_2O, K_2O) and alkaline earth oxides (CaO, MgO, BaO).

13. The method of claim 3, wherein the binder includes at least one member selected from the group consisting of polyethylene glycol, water, a mixture of polyethylene glycol and water and colloidal silica.

CLAIMS

What is claimed is:

1. A method of forming a vitrified superabrasive product, the method comprising:

providing a mixture including a glass powder, a suberabrasive grit, and silicon carbide; and

heating the mixture such that the silicon carbide is oxidized and acts as a foaming agent to form pores of the vitrified superabrasive product.

2. The method of claim 1, further comprising forming a green body that includes the glass powder, the superabrasive grit, and the silicon carbide.

3. The method of claim 2, wherein the green body includes a binder.

4. The method of claim 1, wherein the mixture is heated at a temperature in a range of between about 600°C to 820°C.

5. The method of claim 1, wherein the mixture is heated for a period of time in a range of about one-half hour to about 10 hours.

6. The method of claim 1, wherein heating the mixture produces a fired product and the method further comprises cooling the fired product to form the vitrified superabrasive product.

7. The method of claim 1, wherein the superabrasive grit includes a diamond particulate.

8. The method of claim 1, wherein the superabrasive grit has an average particle size in a range of between about 0.5 μm and about 60 μm.

9. The method of claim 1, wherein a volume ratio of superabrasive grit to glass powder is in a range of between about 3:2 and about 1:99.

10. The method of claim 1, wherein the silicon carbide is present in the form of particles having a number average particle size in a range of between about 0.1 microns and about 20 microns.

11. The method of claim 3, wherein the silicon carbide is present in the mixture in an amount in a range of between about 0.1 and about 5 volume percent of the total amount of glass powder, abrasive grit, binder and silicon carbide components of the mixture.

12. The method of claim 1, wherein the glass powder includes at least one member selected from the group consisting of silicon dioxide (SiO_2), boron oxide (B_2O_3), aluminum oxide (Al_2O_3), alkali oxides (Li_2O, Na_2O, K_2O) and alkaline earth oxides (CaO, MgO, BaO).

13. The method of claim 3, wherein the binder includes at least one member selected from the group consisting of polyethylene glycol, water, a mixture of polyethylene glycol and water and colloidal silica.