

WHAT IS CLAIMED IS:

1. A particulate high-emissivity (high- ϵ) refractory product comprising a mixture of:
 - (a) a particulate refractory base material which includes at least one particulate binder material, at least one particulate refractory raw material filler material and optionally at least one refractory additive; and
 - (b) a high- ϵ pigment in an amount sufficient to impart high- ϵ properties to the refractory product when cured of at least 0.80.
2. The particulate high- ϵ refractory product according to claim 1, wherein the refractory product has a final particle size distribution (D_{psf}) which is substantially equal to a predetermined target particle size distribution (D_{pst}) of the particulate refractory base material.
3. The particulate high- ϵ refractory product according to claim 2, wherein the product further comprises an amount of a particle size distribution adjusting component sufficient to adjust the particle size distribution to achieve the D_{psf} .
4. The particulate high- ϵ refractory product according to claim 3, wherein the particle size distribution adjusting component is at least one inorganic metal oxide selected from the group consisting of brown fused alumina, white fused alumina and silicon carbide.
5. The particulate high- ϵ refractory product according to claim 3, wherein the particle size distribution adjusting component is

present in an amount of up to about 20 wt.%, based on total weight of the particulate high- ϵ refractory material product

6. The particulate high- ϵ refractory product according to claim 2, wherein each of the D_{pst} and the D_{psf} of the refractory product has a distribution of particles sizes of:
4 mesh < 2%;
10 mesh = 23% +/- 5%;
20 mesh = 42% +/- 5%;
100 mesh = 58% +/- 5%;
200 mesh = 64% +/- 5%, and
-325 mesh = 32% +/- 5%.
7. The particulate high- ϵ refractory product according to claim 1, wherein the particulate binder material is present in the refractory base material in an amount of 2 wt.% to about 30 wt.%, based on total weight of the particulate high- ϵ refractory material product.
8. The particulate high- ϵ refractory product according to claim 1, wherein the refractory raw material filler material is present in the refractory base material in an amount of 50 wt.% to about 99 wt.%, based on total weight of the particulate high- ϵ refractory material product.
9. The particulate high- ϵ refractory product according to claim 1, wherein the refractory raw material filler includes at least one particulate refractory selected from the group consisting of alumina-silicates, aluminas, silicon carbides, zirconia-containing raw

materials, magnesium-aluminum spinels, silica fume, calcined flint, fused silicas and silica sands.

10. The particulate high- ϵ refractory product according to claim 1, wherein the refractory raw material filler has an average particle size of below 3 mesh.
11. The particulate high- ϵ refractory product according to claim 1, wherein the at least one refractory additive is selected from the group consisting of dispersants, coagulants including set time accelerants and set time retardants, flocculants, deflocculants, plasticizers, colorants, foaming agents, water-retaining agents, anti-settling agents and preservatives.
12. The particulate high- ϵ refractory product according to claim 1, wherein the at least one refractory additive is present in an amount of up to about 15 wt.%, based on total weight of the particulate high- ϵ refractory material product
13. The particulate high- ϵ refractory product according to claim 1, wherein the high- ϵ pigment is present in an amount sufficient to impart an emissivity to the product when cured of between about 0.80 to about 0.95.
14. The particulate high- ϵ refractory product according to claim 13, wherein the high- ϵ pigment is present in an amount sufficient to impart an emissivity to the product when cured of between about 0.90 to about 0.93.

15. The particulate high- ϵ refractory product according to claim 13, wherein the high- ϵ pigment is present in an amount up to about 20 wt.%, based on the total weight of the particulate high- ϵ refractory product.
16. The particulate high- ϵ refractory product according to claim 13, wherein the high- ϵ pigment is present in an amount between about 2 wt.% to about 20 wt.%, based on the total weight of the particulate high- ϵ refractory product.
17. The particulate high- ϵ refractory product according to claim 16, wherein the high- ϵ pigment is present in an amount between about 3 wt.% to about 10 wt.%, based on the total weight of the particulate high- ϵ refractory product.
18. The particulate high- ϵ refractory product according to claim 16, wherein the high- ϵ pigment is present in an amount between about 4 wt.% to about 6 wt.%, based on the total weight of the particulate high- ϵ refractory product.
19. An castable refractory wet mix which comprises the particulate high- ϵ refractory product according to claim 1 and water.
20. A cured refractory component which is comprised of a cured residue of the castable refractory wet mix according to claim 19.
21. A method of forming the particulate high- ϵ refractory product according to claim 1, wherein the method comprises dry mixing the particulate refractory base material with an amount of a high- ϵ

pigment sufficient to impart high- ϵ properties to the refractory product when cured of at least 0.80.

22. The method according to claim 21, which further comprises adding a particle size distribution adjusting component to the dry mixture of the refractory base material and the high- ϵ pigment sufficient to adjust a final particle size distribution (D_{psf}) of the high- ϵ refractory product to correspond substantially to a target particle size distribution (D_{pst}) of the refractory base material.
23. A method of forming a castable refractory wet mix which comprises adding water to the particulate high- ϵ refractory product according to claim 1.
24. A method of forming an aqueous refractory slurry which comprises dispersing the particulate high- ϵ refractory product according to claim 1 in water.
25. A method for forming a refractory insulating foam material comprising:
 - (i) forming the aqueous refractory slurry according to claim 24; and
 - (ii) combining the aqueous refractory slurry with an aqueous foaming agent to prepare the refractory insulating foam material.