WHAT IS CLAIMED IS:

1. An electroconductive paste comprising:

a copper component comprising first copper particles having a specific surface area of about 0.15 – 1.0 m^2/g, and second copper particles having a specific surface area of about 0.5 – 2.5 m^2/g;

glass frit; and

organic vehicle.

2. The electroconductive paste of claim 1, wherein the first copper particles have a specific surface area of about 0.15 – 0.5 m^2/g, preferably about 0.15-0.35 m^2/g.

3. The electroconductive paste of claims 1-2, wherein the second copper particles have a specific surface area of about 0.5 – 1.5 m^2/g, preferably about 0.9 – 1.3 m^2/g.

4. The electroconductive paste of claims 1-3, wherein the difference between the specific surface area of the first copper particles and the specific surface area of the second copper particles is at least 0.4 m^2/g.

5. The electroconductive paste of claims 1-4, wherein the first copper particles have an average particle size of less than 2 microns.

6. The electroconductive paste of claims 1-5, wherein the second copper particles have an average particle size of about 2.5 – 4.7 microns.

7. The electroconductive paste of claims 1-6, wherein the first copper particles are about 60-80 wt. % of the paste, preferably about 70 wt. % of the paste.

8. The electroconductive paste of claims 1-7, wherein the content of the second copper particles is up to about 20 wt. % of the paste, preferably about 10 wt. % of the paste.

9. The electroconductive paste of claims 1-8, wherein the glass frit comprises oxides which are substantially lead-free.

10. The electroconductive paste of claims 1-9, wherein the glass frit comprises boron-zinc-barium oxide.

11. The electroconductive paste of claims 1-10, wherein the glass frit is about 1-10 wt. % of the paste.

12. The electroconductive paste of claims 1-11, wherein the organic vehicle comprises a binder and an organic solvent.

13. The electroconductive paste of claims 1-12, wherein the organic vehicle comprises an acrylic binder and texanol.

14. The electroconductive paste of claims 1-13, wherein the organic vehicle is about 10 - 30 wt. % of the paste.

15. The electroconductive paste of claims 1-14, further comprising copper oxide.

16. The electroconductive paste of claims 1-15, wherein the copper oxide is about 0.5 – 3 wt. % of the paste.

17. An electroconductive paste comprising:

60 – 95 wt. % copper particles;

glass frit comprising boron-zinc-barium oxide; and

organic vehicle.

18. The electroconductive paste of claim 17, wherein the glass frit is about 1-5 wt. % of the paste.

19. The electroconductive paste of claims 17-18, wherein the organic vehicle comprises a binder and an organic solvent.

20. The electroconductive paste of claims 17-19, wherein the organic vehicle comprises an acrylic binder and texanol.

21. The electroconductive paste of claims 17-20, wherein the organic vehicle is about 1-20 wt. % of the paste.

22. The electroconductive paste of claims 17-21, further comprising copper oxide.

23. The electroconductive paste of claims 17-22, wherein the copper oxide is about 0.5 – 3 wt. % of the paste.

24. A method of forming an electroconductive circuit, comprising the steps of:

depositing an electroconductive paste to form a pattern for a conductive lead, wherein the electroconductive paste comprising a copper component comprising first copper particles having a specific surface area of about 0.15 – 1.0 m^2/g, and second copper particles having a specific surface area of about 0.5 – 2.5 m^2/g, a glass frit and an organic vehicle;

subjecting the conductive lead to a peak temperature of about 540-610°C in a nitrogen atmosphere comprising about 0.5-20 ppm oxygen;

holding the temperature at the peak temperature for about 8-10 minutes.

25. The method of forming an electroconductive circuit according to claim 24, wherein the nitrogen atmosphere comprises about 1-10 ppm oxygen.

26. The method of forming an electroconductive circuit according to claims 24-25, wherein the nitrogen atmosphere comprises about 2-3 ppm oxygen.

27. The method of forming an electroconductive circuit according to claims 24-26, wherein the conductive lead is heated from room temperature to a peak temperature of about 540-610°C over about 25-28 minutes, held at the peak temperature for 8-10 minutes, and cooled back to room temperature over about 14-16 minutes.

28. The method of forming an electroconductive circuit according to claims 24-27, wherein the first copper particles have a specific surface area of about 0.15 – 0.5 m^2/g, preferably about 0.15 – 0.35 m^2/g.

29. The method of forming an electroconductive circuit according to claims 24-28, wherein the second copper particles have a specific surface area of about 0.5 – 1.5 m^2/g. preferably about 0.9 – 1.3 m^2/g.

30. The method of forming an electroconductive circuit according to claims 24-29, wherein first copper particles have an average particle size of less than 2 microns.

31. The method of forming an electroconductive circuit according to claims 24-30, wherein second copper particles have an average particle size of about 2.5 – 4.7 microns.

32. The method of forming an electroconductive circuit according to claims 24-31, wherein the first copper particles are about 60-80 wt. % of the paste, preferably about 70 wt. % of the paste.

33. The method of forming an electroconductive circuit according to claims 24-32, wherein the content of the second copper particles is up to about 20 wt. % of the paste, preferably about 10 wt. % of the paste.

34. The method of forming an electroconductive circuit according to claims 24-33, wherein the glass frit comprises oxides which are substantially lead-free.

35. The method of forming an electroconductive circuit according to claims 24-34, wherein the glass frit comprises boron-zinc-barium oxide.

36. The method of forming an electroconductive circuit according to claims 24-35, wherein the glass frit is about 1-10 wt. % of the paste.

37. The method of forming an electroconductive circuit according to claims 24-36, wherein the organic vehicle comprises a binder and an organic solvent.

38. The method of forming an electroconductive circuit according to claims 24-37, wherein the organic vehicle comprises an acrylic binder and texanol.

39. The method of forming an electroconductive circuit according to claims 24-38, wherein the organic vehicle is about 10 - 30 wt. % of the paste.

40. The method of forming an electroconductive circuit according to claims 24-39, wherein the electroconductive paste further comprising copper oxide.

41. The method of forming an electroconductive circuit according to claims 24-40, wherein the copper oxide is about 0.5 – 3 wt. % of the paste.

CLAIMED

1. An electroconductive paste comprising:

a copper component comprising first copper particles having a specific surface area of about 0.15-1.0 m^2/g, and up to about 20 wt% second copper particles having a specific surface area of about 0.5-2.5 m^2/g, based upon 100% total weight of the paste, wherein the specific surface area of the first copper particles is different from the specific surface area of the second copper particles;

glass frit; and

organic vehicle.

2. The electroconductive paste of claim 1, wherein the first copper particles have a specific surface area of about 0.15-0.5 m^2/g.

3. The electroconductive paste of claim 1, wherein the second copper particles have a specific surface area of about 0.5-1.5 m^2/g.

4. The electroconductive paste of claim 1, wherein the difference between the specific surface area of the first copper particles and the specific surface area of the second copper particles is at least 0.4 m^2/g.

5. The electroconductive paste of claim 1, wherein the first copper particles have an average particle size of less than 2 microns.

6. The electroconductive paste of claim 1, wherein the second copper particles have an average particle size of about 2.5-4.7 microns.

7. The electroconductive paste of claim 1, wherein the first copper particles are about 60-80 wt. % of the paste.

8. The electroconductive paste of claim 1, wherein the glass frit comprises oxides which are substantially lead-free.

9. The electroconductive paste of claim 1, wherein the glass frit comprises boron-zinc-barium oxide.

10. The electroconductive paste of claim 1, wherein the glass frit is about 1-10 wt. % of the paste.

11. The electroconductive paste of claim 1, wherein the organic vehicle comprises a binder and an organic solvent.

12. The electroconductive paste of claim 1, wherein the organic vehicle comprises an acrylic binder and texanol.

13. The electroconductive paste of claim 1, wherein the organic vehicle is about 10-30 wt. % of the paste.

14. The electroconductive paste of claim 1, further comprising copper oxide.

15. The electroconductive paste of claim 14, wherein the copper oxide is about 0.5-3 wt. % of the paste.

16. An electroconductive paste comprising:

60-95 wt. % of a copper component comprising first copper particles having a specific surface area of about 0.15 – 1.0 m^2/g and second copper particles having a specific surface area of about 0.5 – 2.5 m^2/g, wherein the difference between the specific surface area of the first copper particles and the specific surface area of the second copper particles is at least 0.4 m^2/g;

glass frit comprising boron-zinc-barium oxide; and
organic vehicle.

17. The electroconductive paste of claim 16, wherein the glass frit is about 1-5 wt. % of the paste.

18. The electroconductive paste of claim 16, wherein the organic vehicle comprises a binder and an organic solvent.

19. The electroconductive paste of claim 16, wherein the organic vehicle comprises an acrylic binder and texanol.

20. The electroconductive paste of claim 16, wherein the organic vehicle is about 1-20 wt. % of the paste.

21. The electroconductive paste of claim 16, further comprising copper oxide.

22. The electroconductive paste of claim 21, wherein the copper oxide is about 0.5-3 wt. % of the paste.