CLAIMS

1. A multi-, preferably, two-part acrylic cold curing composition for metallography moulds to produce a metallography mount comprising a storage stable solid part and a storage stable liquid part, the parts being operable to form a mixture which polymerises to a solid mass upon mixing of the parts together, the solid part comprising polymer powder and initiator and the liquid part comprising acrylic monomer and optionally activator or accelerator, the initiator component being present in an amount effective to polymerize the acrylic monomer component upon being mixed with the liquid part characterized in that the acrylic monomer component comprises a cyclic ester side group containing monofunctional acrylic monomer, wherein the cyclic ester side group containing monofunctional acrylic monomer comprises between 70 and 96 % w/w of the total monomers in the uncured composition.

2. A multi-, preferably, two-part acrylic cold curing composition for metallography moulds to produce a metallography mount comprising a storage stable solid part and a storage stable liquid part, the parts being operable to form a mixture which polymerises to a solid mass upon mixing of the parts together, the solid part comprising polymer powder and initiator and the liquid part comprising acrylic monomer and optionally activator or accelerator, the initiator component being present in an amount effective to polymerize the acrylic monomer component upon being mixed with the liquid part characterized in that the acrylic monomer component comprises a cyclic ester side group containing monofunctional acrylic monomer, wherein the liquid part comprises a mixture of monofunctional monomer(s) and polyfunctional monomer(s), and wherein the polyfunctional monomers comprise between 12 and 22% w/w of the total monomers in the uncured composition.

3. A solid metallography mount produced from mixing a multi-part acrylic composition comprising a storage stable solid part and a storage stable liquid part, the parts being operable to form a mixture which polymerises to a solid mass upon mixing of the parts together, the solid part comprising polymer powder and initiator and the liquid part comprising acrylic monomer and optionally activator or accelerator, the initiator component being present in an amount effective to polymerize the acrylic monomer component upon being mixed with the liquid part characterized in that the acrylic monomer component comprises a cyclic ester side group containing monofunctional acrylic monomer.

4. A multi-, preferably, two-part cold curing pack for metallography moulds to produce a metallography mount comprising a first container and a second container, the content of the said first and second containers being in accordance with the solid and liquid parts respectively of any one claims 1 to 3.

5. A solid metallography mount derived from a two-part cold curing composition comprising an acrylic polymer at least partially formed from cyclic ester side group containing monofunctional acrylic monomers.

6. A mount according to claim 5, comprising a further polymer, wherein at least one monomer, typically, the cyclic ester side group containing monofunctional acrylic monomer, forming the acrylic polymer is not present in the monomer(s) forming the further polymer.

7. A cold curing composition according to claim 1 or claim 2 or a pack according to claim 4 for use as a cold mounting metallography moulding composition to produce metallography mounts.

8. A composition, pack or mount according to any of claims 1-7, wherein a suitable cyclic ester side group containing monofunctional acrylic monomer is a methacrylate monomer.

9. A composition, pack or mount according to any of claims 1-8, wherein the cyclic ester side group containing monofunctional acrylic monomer is selected from one or more cyclic aliphatic ester methacrylate monomers and/or aryl ester methacrylate monomers.

10. A composition, pack or mount according to claim 9, wherein the cyclic aliphatic ester methacrylate monomers are selected from one or more of cyclohexyl methacrylate, isobornyl methacrylate, dicyclopentenyl methacrylate, dihydrodicyclopentadienyl methacrylate, adamantyl methacrylate, 4-t-butylcyclohexyl methacrylate, 3,3,5-trimethylcyclohexyl methacrylate and tetrahydrofurfuryl methacrylate.

11. A composition, pack or mount according to claim 9, wherein the cyclic aliphatic ester methacrylate monomers are selected from one or more of cyclohexyl methacrylate, isobornyl methacrylate, dicyclopentenyl methacrylate, dihydrodicyclopentadienyl methacrylate, adamantyl methacrylate, 4-t-butylcyclohexyl methacrylate, and 3,3,5-trimethylcyclohexyl methacrylate.

12. A composition, pack or mount according to claim 9, wherein the aryl ester methacrylate monomers are selected from one or more of benzyl methacrylate, 2-phenoxyethylmethacrylate and phenyl methacrylate.

13. A composition, pack or mount according to any preceding claim, wherein the monofunctional monomer used in the liquid part or monofunctional monomer residues of the acrylic polymer comprise a mixture of more than one monofunctional acrylic monomer or residue thereof.

14. A composition, pack or mount according to claim 3 to 13, wherein the cyclic ester side group containing monofunctional acrylic monomer or residue thereof comprises between 10 and 100% w/w of the total monomers in the uncured composition or monomer residues in the acrylic polymer.

15. A composition, pack or mount according to claim 14, wherein the cyclic ester side group containing monofunctional monomer or residue thereof comprises between 70 and 98% w/w of the total monomers in the uncured composition liquid part or monomer residues in the acrylic polymer, typically, between 70 and 96%, more typically between 75 and 96% w/w, or between 80 and 96%, most typically between 75 and 90% w/w or between 78 and 88% w/w.

16. A composition, pack or mount according to claim 1 to 15, wherein the balance of monomers is made up of polyfunctional and, optionally, other monofunctional monomer(s).

17. A composition, pack or mount according to claim 16, wherein the polyfunctional monomers described herein or residues thereof comprise between 0 and 90% w/w of the total monomer in the uncured composition or monomer residues in the acrylic polymer.

18. A composition, pack or mount according to claim 16 or 17, wherein the polyfunctional monomers or residues thereof comprise between 2 and 30 % w/w of the total monomers in the uncured composition or monomer residues forming the acrylic polymer, typically, between 4 and 30% w/w, more typically between 4 and 25% w/w, or between 4 and 20% w/w, most typically between 10 and 25% w/w or between 12 and 22% w/w.

19. A composition, pack or mount according to any preceding claim, wherein the acrylic monomer component comprises between 80 and 100% w/w of the liquid part or wherein acrylic monomers form between 80 and 100% w/w of the acrylic polymer.

20. A composition, pack or mount according to claim 1 to 4 or 7, wherein the activator or accelerator comprises between 0 and 10% w/w of the liquid.

21. A composition, pack or mount according to any preceding claim, wherein the liquid part monomer component or acrylic polymer comprises a polyfunctional monomer or residue thereof in addition to a monofunctional monomer or residue thereof and such polyfunctional monomer has at least two polymerisable double bonds per molecule.

22. A composition, pack or mount according to claim 21, wherein the polyfunctional monomer is a bifunctional monomer a trifunctional monomer, a tetrafunctional monomer or a hexafunctional monomer.

23. A composition, pack or mount according to claim 22, wherein the polyfunctional monomer is selected from the group comprising: ethylene glycol dimethacrylate, hexanediol dimethacrylate, tripropylene glycol dimethacrylate, butanediol dimethacrylate, neopentyl glycol dimethacrylate, diethylene glycol dimethacrylate, triethylene glycol dimethacrylate, dipropylene glycol dimethacrylate, allyl methacrylate, divinyl benzene, tripropylene glycol trimethacrylate, trimethylol propane trimethacrylate, pentaerythritol trimethacrylate, pentaerythritol tetramethacrylate, and dipentaerythritol hexamethacrylate.

24. A composition, pack or mount according to claim 21, 22 or 23, wherein a mixture of more than one polyfunctional monomer is used.

25. A composition, pack or mount according to any preceding claim, wherein the liquid part or acrylic polymer comprises a mixture of monofunctional monomer(s) and polyfunctional monomer(s) or residues thereof.

26. A composition, pack or mount according to claim 16 to 18 or 21 to 25, wherein the ratio of monofunctional monomers or residues thereof to polyfunctional monomers or residues thereof in the liquid part or acrylic polymer is between 95:5 wt % and 70:30 wt %.

27. A composition, pack or mount according to claim 1 to 4 or 6, wherein the polymer powder or further polymer is selected from a polymer or copolymer having > 100 monomer residue units.

28. A composition, pack or mount according to claim 1 to 4 or 27, wherein the polymer powder or further polymer is a homopolymer of a polyalkyl(alk)acrylate or (alk)acrylic acid or copolymer of a polyalkyl(alk)acrylate or (alk)acrylic acid with one or more other vinyl monomers.

29. A composition, pack or mount according to claim 28, wherein the polymer powder is a homopolymer of methyl methacrylate, ethyl methacrylate, iso-butyl methacrylate or n-butyl methacrylate or a copolymer of methyl methacrylate, ethyl methacrylate, iso-butyl methacrylate or n-butyl methacrylate with one or more other vinyl monomers.

30. A composition, pack or mount according to any claim 1 to 4 or 27 to 29, wherein the polymer powder is in the form of beads having a mean particle size of between 10 microns and 800 microns, for example in the range 15 to 600 microns.

31. A composition, pack or mount according to any claim 1 to 4 or 27 to 30, wherein the polymer powder comprises between 60 and 99.9% w/w of the solid part.

32. A composition, pack or mount according to any claim 1 to 4 or 27 to 31, wherein the initiator comprises between 0.1 and 15 % w/w of the solid part.

33. A composition, pack or mount according to any claim 1 to 4, 6 or 27 to 32, wherein the ratio of solid to liquid part or the ratio of the acrylic polymer to the further polymer is in the range 1:2 to 4:1 by weight.

34. A composition, pack or mount according to any preceding claim, wherein monofunctional monomers or residues thereof other than the acrylic monofunctional monomers or residues thereof are not present in the liquid part of the composition or the acrylic polymer.

35. A composition, pack or mount according to claim 34, wherein ethyl methacrylate monofunctional monomers or residues thereof are not present in the liquid part of the composition or acrylic polymer.

36. A composition, pack or mount according to any preceding claim, further comprising a polymerisation activator or accelerator selected from a barbituric acid compound, preferably present in the storage stable solid part, in combination with transition metal salt, preferably present in, more preferably, dissolved in, the liquid part.

37. A composition, pack or mount according to claim 36, wherein the polymerisation activator or accelerator comprises 0.1 wt% to 2.0 wt% of barbituric acid compound, such as 1-Benzyl 5-phenylbarbituric acid, in the solid part and 0.005 wt% to 0.05 wt% of copper compound, such as copper acetyl acetonoate, dissolved in the liquid part.

38. A process of producing a metallography mount comprising the steps of:-

- mixing a solid part and a liquid part according to any of the preceding claims together to form a liquid or semi-solid paste;
- pouring the liquid or semi-solid paste into a mould containing a metallography sample to be analysed to at least partially encapsulate the sample;
- allowing the liquid or semi-solid paste to harden around the sample; and
- optionally, releasing the mounted metallography sample from the mould for analysis or further preparation.

39. A process of producing a metallography mount comprising the steps of:-

- mixing a storage stable solid part and a storage stable liquid part together to form a liquid or semi-solid paste, the solid part comprising polymer powder and initiator and the liquid part comprising acrylic monomer and optionally activator or accelerator, the

initiator component being present in an amount effective to polymerize the acrylic monomer component upon being mixed with the liquid part characterized in that the acrylic monomer component comprises a cyclic ester side group containing monofunctional acrylic monomer;

- pouring the liquid or semi-solid paste into a mould containing a metallography sample to be analysed to at least partially encapsulate the sample;
- allowing the liquid or semi-solid paste to harden to form a solid mass around the sample; and

optionally, releasing the mounted metallography sample from the mould for analysis or further preparation.