Claims

1. Process for producing a polymethacrylate foam, wherein a composition containing from 0.2 to 2.0% by weight of an initiator, from 0 to 20 % by weight of an unpolymerizable blowing agent, from 0 to 5% by weight of a chain-transfer agent and from 70 to 99.8% by weight of a monomer mixture consisting of from 70 to 95% by weight of MMA, from 0.1 to 5% by weight of alkyl acrylates having from 1 to 12 carbon atoms in the alkyl radical, from 0 to 10% by weight of alkyl methacrylates having from 2 to 12 carbon atoms in the alkyl radical, from 0.5 to 10% by weight of methacrylamides, N-alkylmethacrylamides and/or N,N-dialkylmethacrylamides, from 0 to 10% by weight of crosslinkers, from 0 to 10% by weight of acrylic, methacrylic and/or itaconic acid and from 0 to 10% by weight of a hydroxy functional alkyl (meth)acrylate, where the entire monomer mixture of part of the monomer mixture can be present to an extent of up to 80% by weight as polymer and/or oligomer at the beginning of the polymerization, is polymerized at a temperature in the range from 20°C to 100°C and subsequently foamed at from 130°C to 250°C.

2. Process according to Claim 1, wherein the polymerization is carried out at a temperature in the range from 30°C to 70°C and foaming is carried out at a temperature in the range from 150°C to 230°C.

3. Process according to at least one of Claims 1 and 2, wherein the crosslinker is a di(meth)acrylate, tri(meth)acrylate or tetra(meth)acrylate, allyl (meth)acrylate, triallyl cyanurate, triallyl isocyanurate or a mixture containing at least two of these crosslinkers.

4. Process according to at least one of Claims 1 to 3, wherein the alkyl methacrylates are entirely or partly tert-butyl methacrylate and/or isopropyl methacrylate and/or wherein the alkyl acrylates are entirely or partly tert-butyl acrylate and/or isopropyl acrylate.

5. Process according to Claim 4, wherein the monomer mixture contains from 5 to 10% by weight of tert-butyl methacrylate, isopropyl methacrylate, tert-butyl acrylate and/or isopropyl acrylate the proportion of tert-butyl acrylate and isopropyl acrylate being no more than 5% by weight, and wherein the composition does not comprise any uncopolymerizable blowing agent.

6. Process according to Claim 1, wherein the composition contains from 0.5 to 1.5% by weight of the initiator, from 0 to 15% by weight of an unpolymerizable blowing agent, from 0 to 1% by weight of chain-transfer agents and from 75 to 98.49% by weight of the monomer mixture, where the monomer mixture is composed of from 75 to 95% by weight

of MMA, from 0.5 to 2.5% by weight of alkyl acrylates having from 1 to 8 carbon atoms in the alkyl radical, from 0 to 5% by weight of alkyl methacrylates having from 2 to 8 carbon atoms in the alkyl radical, from 1 to 8% by weight of methacrylamides, N-alkylmethacrylamides and/or N,N-dialkylmethacrylamides, from 0 to 5% by weight of dimethacrylate or trimethacrylate and from 0 to 8% by weight of acrylic, methacrylic and/or itaconic acid and is present to an extent of from 0 to 50% by weight as polymer and/or oligomer.

7. Process according to at least one of Claims 1 to 6, wherein the monomer mixture comprises N-alkyl(meth)acrylamides having from 1 to 12 carbon atoms in the alkyl group and no methacrylamide or N,N-dialkylmethacrylamides.

8. Process according to Claim 7, wherein the N-alkyl(meth)acrylamide is N-methylolmethacrylamide, 2 hydroxypropylmethacrylamide or N-isopropylmethacrylamide.

9. Process according to at least one of Claims 1 to 8, wherein the polymerization and/or foaming are carried out stepwise at different temperatures.

10. Process according to at least one of Claims 1 to 9, wherein the polymerization and foaming are carried out at least partly simultaneously.

11. PMMA foam, wherein the solid part of this foam comprises at least 95% by weight of a polymer produced from a monomer mixture consisting of from 70 to 95% by weight of MMA, from 0.1 to 5% by weight of alkyl acrylates having from 1 to 12 carbon atoms in the alkyl radical, from 0 to 10% by weight of alkyl methacrylates having from 2 to 12 carbon atoms in the alkyl radical, from 0.5 to 10% by weight of methacrylamides, N-alkylmethacrylamides and/or N,N-dialkylmethacrylamides, from 0 to 10% by weight of crosslinkers, from 0 to 10% by weight of acrylic, methacrylic and/or itaconic acid and from 0 to 10% by weight of a hydroxy-functional alkyl (meth)acrylate and wherein the foam has a density in the range from 50 to 350 kg/m^3.

12. PMMA foam according to Claim 11, wherein the PMMA foam has a density in the range from 75 to 250 kg/m^3.