Claims

1. Process for producing a polymethacrylate foam, wherein a composition containing from 0.01 to 2.0 wt% of an initiator, from 2 to 20 wt% of a blowing agent, from 0.2 to 10 wt% of silicon oxide particles having a diameter between 4 and 1000 nm and from 70 to 97.79 wt% of a polymer-forming mixture, wherein said polymer-forming mixture consists of MMA and/or MMA repeat units to an extent of not less than 75 mol% and may be present as polymer and/or oligomer to an extent of from 0 to 80 wt%, is polymerized at a temperature between 20°C and 100°C and subsequently foamed at between 130°C and 250°C.

2. Process according to Claim 1, wherein the composition contains from 0.5 to 8 wt% of SiO_2 particles having a diameter between 5 and 500 nm.

3. Process according to Claim 1 or 2, wherein the composition contains from 0.2 to 1.5 wt% of the initiator, from 3 to 15 wt% of the blowing agent, from 0.5 to 8 wt% of SiO_2 particles and from 75 to 97.8 wt% of the polymer-forming mixture, wherein said polymer-forming mixture consists of MMA to an extent of not less than 75 mol% and is present as polymer and/or oligomer to an extent of from 0 to 50 wt%.

4. Process according to one or more of Claims 1 to 3, wherein the temperature is between 30°C and 70°C for the polymerization and between 150°C and 230°C for the foaming.

5. Process according to one or more of Claims 1 to 4, wherein the polymer-forming composition contains up to 0.5 wt% of crosslinker and/or up to 1.5 wt% of chain transfer agent.

6. Process according to one or more of Claims 1 to 5, wherein the polymer-forming mixture contains MMA-copolymerizable comonomers and/or –copolymerized comonomers in the polymers and/or oligomers, and in that the comonomers comprise (meth)acrylic acid, methyl acrylate, ethyl (meth)acrylate, propyl (meth)acrylate, n-butyl (meth)acrylate, tert-butyl (meth)acrylate, isopropyl (meth)acrylate, isobutyl (meth)acrylate, styrene, (meth)acrylamide, an N-alkyl(meth)acrylamide having one to 12 carbon atoms in the alkyl group, a hydroxyalkyl (meth)acrylate having one to 4 carbon atoms in the alkyl group or mixtures of two or more thereof.

7. Process according to one or more of Claims 1 to 6, wherein the polymerization and/or the foaming are/is effected stagewise at different temperatures.

8. Process according to one or more of Claims 1 to 7, wherein the polymerization and the foaming are effected simultaneously to some extent at least.

9. Process according to one or more of Claims 1 to 8, wherein the blowing agent comprises tert-butyl (meth)acrylate, isopropyl (meth)acrylate, tert-butanol, tert-butyl methyl ether, isopropanol and poly(tert-butyl (meth)acrylate), wherein isopropyl (meth)acrylate and/or tert-butyl (meth)acrylate are/is at the same time part of the recited monomer composition and are wholly or partly copolymerized into the polymers formed therefrom.

10. PMMA foam, wherein the solid fraction of this PMMA foam contains from 0.2 to 12.5 wt% of silicon oxide particles having a diameter between 4 and 1000 nm and from 72 to 98 wt% of a polymer incorporating not less than 75 mol% of MMA repeat units, and in that the foam has a density between 25 and 250 kg/m^3 and an average cell size below 500 µm.

11. PMMA foam according to Claim 10, wherein the PMMA foam has an overall cell size below 500 µm.