CLAIMS

1. An energy-saving foamed polypropylene bead, wherein the raw material comprises the following ingredients in parts by weight: 85-99 parts of foamable polypropylene with a high melting point, 1-15 parts of polyolefin with a low melting point and an auxiliary agent mainly comprising an antioxidant and a lubricant;

wherein the foamable polypropylene with high melting point is a random copolymer which is a propylene-butene copolymer, the foamable polypropylene has a melting point in a range of 143-150 °C, and the foamable polypropylene has a bending modulus ranging from 900 MPa to 1200 MPa;

wherein the polyolefin with the low melting point is polyethylene or polypropylene;

wherein the polyethylene is LDPE, HDPE or LLDPE, the density of the polyethylene is 0.920-0.935 g/cm³, the elongation at break of the polyethylene is greater than 800%, the softening point of the polyethylene is 100-110 °C, the melt index of the polyethylene is 2-15, and the melting point of the polyethylene is 100-140 °C; and

the polypropylene is a random copolymer of ethylene, propylene and butene, and has a melting point of 115-140 °C, a melt index of 5-15, and an elongation at break of greater than 500%.

2. The foamed polypropylene bead according to claim 1, wherein the foamable polypropylene with the high melting point is located on a core layer, and a polyethylene material is located on a skin layer.

3. The foamed polypropylene bead according to claim 1, wherein the foamable polypropylene with the high melting point comprises one or two of an inorganic pore nucleating agent and an organic pore nucleating agent, the inorganic pore nucleating agent is one or more of calcium carbonate, talcum powder, kaolin, coarse whiting, zinc borate, silicon dioxide and titanium dioxide, and the organic pore nucleating agent is one or more of calcium stearate and zinc stearate.

4. The foamed polypropylene bead according to claim 3, wherein the particle diameter of the inorganic pore nucleating agent is 0.5-5 μm.

5. The foamed polypropylene bead according to claim 3, wherein the particle diameter of the inorganic pore nucleating agent is 2-5 μm.

6. The foamed polypropylene bead according to claim 3, wherein the inorganic pore nucleating agent comprises crystal water substance.

7. The foamed polypropylene bead according to claim 3, wherein the organic pore nucleating agent is a 15-40 carbon chain salt.

8. The foamed polypropylene bead according to claim 1, wherein the polyolefin with the low melting point contains no pore nucleating agent.

9. The foamed polypropylene bead according to claim 1, wherein the melt index of the polyethylene is 5-14.

10. The foamed polypropylene bead according to claim 1, wherein the foamable polypropylene with the high melting point comprises a gas storage auxiliary agent, and the gas storage auxiliary agent is one or two of porous silicon dioxide or porous titanium dioxide.

11. The foamed polypropylene bead according to claim 10, wherein the porous silicon dioxide or the porous titanium dioxide has an aperture of 70-80 nm and a porosity of 65-86%.

12. The foamed polypropylene bead according to claim 1, wherein the other auxiliary agent in the foamable polypropylene with the high melting point is one or more of fire retardant, color master batch, dispersing agent, antioxidant, lubricant, antistatic agent, coupling agent, stabilizer and ultraviolet light absorber.

13. A preparation method of the foamed polypropylene bead according to any one of claims 1-12, comprising the following steps:

step 1, performing mixing, extrusion and wire drawing on a foamable polypropylene with a high melting point and a polyethylene according to a proportion of parts by weight via an extruding machine, and performing grain cutting via a grain cutting device to form modified polypropylene microparticles, wherein the foamable polypropylene with the high melting point accounts for 85-99 parts, and polyolefin with a low melting point accounts for 1-15 parts; the foamable polypropylene with the high melting point is a random copolymer which is a propylene-butene copolymer having a melting point of 143-150 °C, and a bending modulus greater than 900 MPa, and auxiliary agents mainly comprise an antioxidant and a lubricant; the polyolefin with the low melting point is polyethylene, or polypropylene; the polyethylene is LDPE, HDPE or LLDPE, the density of the polyethylene is 0.920-0.935 /cm^3, the elongation at break of the polyethylene is greater than 800%, the softening point of the polyethylene is 100-110 °C, the melt index of the polyethylene is 2-15, and the melting point of the polyethylene is 100-140 °C; and the polypropylene is a random copolymer of ethylene, propylene and butene, the melting point of the polypropylene is 115-140 °C, the melt index of the polypropylene is 5-15, and the elongation at break of the polypropylene is greater than 500%; and

step 2, throwing the modified polypropylene microparticles into a reaction kettle, adding a dispersion medium, and then performing heating pressurization, so that the polypropylene microparticles generate an outwardly expanding internal pressure under high temperature and high pressure, and relieving the pressure to the barometric pressure to obtain a high-expansibility foamed polypropylene material.

14. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 1, double-layer coextrusion is performed by using two extruding machines.

15. The preparation method of the foamed polypropylene bead according to claim 13, wherein a core layer of the double-layer coextrusion is foamable polypropylene, a skin layer

is a polyolefin material with a low melting point, and the weight ratio of the skin layer is 1%-10%.

16. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 1, the wire drawing diameter is 1-2mm, the grain cutting length is 1.8-2.5 mm, and the single grain mass is 0.5-2 mg.

17. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 2, the selected heating pressurization gas is carbon dioxide.

18. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 2, the temperature of the reaction kettle is 145-160 °C, the pressure is 1.5-3 MPa, and the heating time is 45-65 minutes.

19. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 2, the temperature of the reaction kettle is 147-153 °C, the pressure is 1.8-2.4 MPa, and the heating time is 50-65 minutes.

20. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 2, the dispersion medium is one or two of kaolin and butter.

21. The preparation method of the foamed polypropylene bead according to claim 20, wherein in the step 2, the mass of the dispersion medium accounts of 0.2-1% of that of the polypropylene microparticles.

22. The preparation method of the foamed polypropylene bead according to claim 20, wherein in the step 2, in the dispersion medium, kaolin: butter is 3:1 to 6:1.

23. The preparation method of the foamed polypropylene bead according to claim 20, wherein in the step 2, in the dispersion medium, calcium phosphate: butter is 3:1 to 6:1.

24. The preparation method of the foamed polypropylene bead according to claim 13, wherein in the step 2, the pressure relief process is performed in a healthcare foaming tube connected with the reaction kettle.

25. The preparation method of the foamed polypropylene bead according to claim 24, wherein the foaming tube 2-4m.

26. The preparation method of the foamed polypropylene bead according to claim 24, wherein the atmosphere temperature in the channel is controlled at 90-100 ° C.

27. The preparation method of the foamed polypropylene bead according to claim 13, wherein the draw ratio of the bead after being foamed is 0.5-2.

28. The preparation method of the foamed polypropylene bead according to claim 13, wherein the draw ratio of the bead after being foamed is 0.8-1.5.