SUMMARY OF THE DISCLOSURE

The present disclosure provides a foam bead formed from a composition comprising one or more polyolefin interpolymers, wherein the foam bead has a gel content of higher than or equal to 80%, and a tanδ at 1 rad/s of lower than or equal to 0.11.

In an aspect, the present disclosure provides an element prepared from a plurality of foam beads, comprising a cavity filled with the foam beads, wherein foam beads are formed from a composition comprising one or more polyolefin interpolymers, wherein the foam bead has a gel content of higher than or equal to 80%, and a tanδ at 1 rad/s of lower than or equal to 0.11, wherein no less than 70 wt% of the one or more polyolefin interpolymers is silane-grafted, wherein the silane-grafted polyolefin interpolymer has a silane grafting ratio of higher than 0.3 wt%, based on the total weight of the silane-grafted polyolefin interpolymer, wherein the foam bead is formed from the composition by crosslinking the pellets of the composition prior to foaming the pellets and where gel content and tanδ are measured as described in the description.

The present disclosure also provides a method for producing polyolefin foam beads, comprising,

(a) providing a composition comprising one or more polyolefin interpolymers;

(b) pelletizing the composition to form pellets;

(c) crosslinking the pellets to a gel content of higher than or equal to 80%; and

(d) foaming the crosslinked pellets into foam beads,

wherein the foam beads has a tanδ at 1 rad/s of lower than or equal to 0.11.

In a further aspect, the present disclosure provides a method for preparing an element from polyolefin foam beads, comprising,

(a) providing a composition comprising one or more polyolefin interpolymers;

(b) pelletizing the composition to form pellets;

(c) crosslinking the pellets to a gel content of higher than or equal to 80%; and

(d) foaming the crosslinked pellets into foam beads,

(e) filling the foam beads into a cavity via a bead filling port of the cavity, and

(f) closing the cavity,

wherein the foam beads have a tanδ at 1 rad/s of lower than or equal to 0.11,

wherein no less than 70 wt% of the one or more polyolefin interpolymers is silane-grafted,

and wherein the silane-grafted polyolefin interpolymer has a silane grafting ratio of higher than 0.3 wt%, based on the total weight of the silane-grafted polyolefin interpolymer

The present disclosure also provides an element prepared from a plurality of the foam beads as described herein, comprising a cavity filled with the foam beads.

The present disclosure also provides a product comprising the element as described herein.

The present disclosure also provides use of the foam beads as described herein in bead-filling applications.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a graph showing the Tanδ of various foamed beads during Frequency sweep.

Figure 2 is a scanning electron microscope (SEM) micrograph of the foam beads prepared in the Examples.

DETAILED DESCRIPTION OF THE DISCLOSURE

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention belongs. Also, all publications, patent applications, patents, and other references mentioned herein are incorporated by reference.

What is claimed is:

1. An element prepared from a plurality of foam beads, comprising a cavity filled with the foam beads,

wherein foam beads are formed from a composition comprising one or more polyolefin interpolymers, wherein the foam bead has a gel content of higher than or equal to 80%, and a tanδ at 1 rad/s of lower than or equal to 0.11,

wherein no less than 70 wt% of the one or more polyolefin interpolymers is silane-grafted,

wherein the silane-grafted polyolefin interpolymer has a silane grafting ratio of higher than 0.3 wt%, based on the total weight of the silane-grafted polyolefin interpolymer,

wherein the foam bead is formed from the composition by crosslinking the pellets of the composition prior to foaming the pellets and where gel content and tanδ are measured as described in the description.

2. The element according to claim 1, wherein the one or more polyolefin interpolymers comprise a polyolefin elastomer.

3. A method for preparing an element from polyolefin foam beads, comprising,

(a) providing a composition comprising one or more polyolefin interpolymers;

(b) pelletizing the composition to form pellets;

(c) crosslinking the pellets to a gel content of higher than or equal to 80%; and

(d) foaming the crosslinked pellets into foam beads,

(e) filling the foam beads into a cavity via a bead filling port of the cavity, and

(f) closing the cavity,

wherein the foam beads have a tanδ at 1 rad/s of lower than or equal to 0.11,

wherein no less than 70 wt% of the one or more polyolefin interpolymers is silane-grafted,

and wherein the silane-grafted polyolefin interpolymer has a silane grafting ratio of higher than 0.3 wt%, based on the total weight of the silane-grafted polyolefin interpolymer.

4. The method of claim 3, wherein the one or more polyolefin interpolymers comprise a polyolefin elastomer.

5. The method of claim 3, wherein the one or more polyolefin interpolymers are selected from the group consisting of one or more ethylene/α-olefin multi-block interpolymers, one or more ethylene/α-olefin random copolymers, and any combination thereof.

6. The method of claim 3, wherein the one or more polyolefin interpolymers have a melt index (MI) of from 0.1 g/10 min to 30 g/10 min.