OLEFIN MULTI-BLOCK COPOLYMER / SILICONE RUBBER / TACKIFIER COMPOSITIONS AND FOAMS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to, and the benefit of, international patent application no. PCT/CN2017/119255, filed on December 28, 2017.

BACKGROUND

Olefin multi-block copolymers can be used to form lightweight shoe midsoles. For use as a unitsole foam, the polymer composition should have good abrasion resistance and good wet traction performance (coefficient of friction (COF)). Although a polydimethyl-siloxane (PDMS) can be used to improve abrasion resistance, the COF will typically decrease, resulting in poor wet traction. Foamable compositions and/or other elastomeric compositions are described in the following references: US2006/0199872, US2011/0199872, US2011/0144240, US4210570, US7671106, US7750073, US8318864, CN104371194A (Abstract), CN105524359A (Abstract), CN105524346A (Abstract), JP3922446B2 (Abstract), KR2008107583A (Abstract), US6767931, US2011/0178195, US2015/0166755, US2016/0067799, KR1075070B1 (abstract), US7671106, US6013217, US2012/0322905, JP3665446B2 (abstract), CN105670199A (abstract), CN103709581B (abstract). However, there is a need for a new polymer compositions that provides good abrasion resistance and good COF and good mechanical properties, while maintaining good abrasion resistance. These needs have been met by the following invention.

SUMMARY

A composition comprising at least the following:

A) an olefin multi-block copolymer;

B) a silicone rubber;

C) a tackifier.

In one aspect, the present disclosure refers to a composition comprising at least the following:

A) an olefin multi-block copolymer in an amount ≥ 50 wt%, based on the weight of the composition;

B) a silicone rubber; and

C) a tackifier,

wherein the composition comprises ≥ 70 wt% of component A, component B and component C, based on the weight of the composition, and

wherein the weight ratio of component A to component C is from 30 to 60.

In another aspect, the present disclosure refers to an article comprising at least one component formed from the composition as disclosed herein.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 depicts a schematic of different samples cut from a Bun foam.

DETAILED DESCRIPTION

CLAIMS

1. A composition comprising at least the following:

A) an olefin multi-block copolymer in an amount ≥ 50 wt%, based on the weight of the composition;

B) a silicone rubber; and

C) a tackifier,

wherein the composition comprises ≥ 70 wt% of component A, component B and component C, based on the weight of the composition, and

wherein the weight ratio of component A to component C is from 30 to 60.

2. The composition of claim 1, wherein the silicone rubber has a weight average molecular weight (Mw) ≥ 100,000 g/mole.

3. The composition of claim 1 or 2, wherein the olefin multi-block copolymer is an ethylene/α-olefin multi-block copolymer.

4. The composition of any one of the previous claims, wherein the tackifier is a hydrocarbon.

5. The composition of any one of the previous claims, wherein the silicone rubber comprises a structure selected from i) and/or a structure selected from ii) below:

i) -O-[Si(R)(CH=CH_2)]-[Si(R')(R")]-O- , wherein R, R' and R" are each, independently, an alkyl group, and further a C1-C6 alkyl group, and wherein R, R' and R" may all be the same alkyl group;

ii) H_2C=CH-[Si(R^{IV})(R^{V})]-O- , wherein R^{IV} and R^{V} are each, independently, an alkyl group, and further a C1-C6 alkyl group, and wherein R^{IV} and R^{V} may be the same alkyl group.

6. The composition of any one of the previous claims, wherein the olefin multi-block copolymer has a density from 0.866 g/cc to 0.887 g/cc.

7. The composition of any one of the previous claims, wherein the olefin multi-block
copolymer has a melt index (I2) from 0.5 to 5.0 g/10 min (190°C and 2.16 kg).

8. An article comprising at least one component formed from the composition of any one of the previous claims.

9. The article of claim 8, wherein the article is a foam.