PROPYLENE/ETHYLENE COPOLYMER FILM FOR HEAT SEAL

BACKGROUND

[0001] The present disclosure provides compositions, films and articles containing a random propylene/ethylene copolymer.

[0002] Optics, toughness, stiffness and seal strength are important performance requirements for packaging. Current random propylene/ethylene copolymers deliver optimum properties at the expense of sacrificing other properties. In general, if one adds more ethylene in a random propylene/ethylene copolymer, the toughness and haze are improved with a reduction in stiffness and gloss. Also, too much ethylene can negatively affect seal parameters such as heat seal initiation temperature and/or hot tack initiation temperature. Conversely, when the ethylene content in the random propylene/ethylene copolymer resin is reduced, the stiffness improves while the toughness and optics are adversely impacted.

[0003] The art recognizes the need for a random propylene/ethylene copolymer with improved stiffness while simultaneously maintaining or improving toughness and/or optics. A need further exists for a random propylene/ethylene copolymer film with improved heat seal properties that does not sacrifice toughness and/or optics.

SUMMARY

[0004] The present disclosure provides a film.

[0004a] In a first aspect, there is provided a film comprising:

a random propylene/ethylene copolymer comprising a substituted phenylene aromatic diester;

the random propylene/ethylene copolymer having an ethylene incorporation index greater than 0.65 and a xylene solubles content according to the following equation

$$\frac{\text{wt \% xylene solubles} - \text{wt \% total ethylene}}{\text{wt \% total ethylene}} < 0.8.$$

[0004b] In an embodiment, the film includes a random propylene/ethylene copolymer. The random propylene/ethylene copolymer includes a substituted phenylene aromatic diester. The random propylene/ethylene copolymer has an ethylene incorporation index greater than 0.65 and a xylene solubles content according to the following equation:

$$\frac{\text{wt \% xylene solubles} - \text{wt \% total ethylene}}{\text{wt \% total ethylene}} < 0.8.$$

[0005] The present disclosure provides an article.

[0005a] In a second aspect, there is provided an article comprising:

a heat seal comprising a first seal portion in contact with a second seal portion, the first seal portion and the second seal portion each a component of a layer,

wherein the layer comprises a random propylene/ethylene copolymer comprising a substituted phenylene aromatic diester.

[0005b] In an embodiment, the article includes a heat seal. The heat seal has a first seal portion in contact with a second seal portion. The first seal portion and the second seal portion each is a component of a layer (such as a film or a layer of a film). The layer includes a random propylene/ethylene copolymer. The random propylene/ethylene copolymer includes a substituted phenylene aromatic diester. The first

seal portion and the second seal portion may be a component of the same film. Alternatively, each seal portion is a component of a separate film.

[0006] The present disclosure provides a container.

[0006a] In a third aspect, there is provided a container comprising:

a film comprising a random propylene/ethylene copolymer comprising a substituted phenylene aromatic diester; and

a heat seal sealing a first film portion to a second film portion and defining a container interior.

[0006b] In an embodiment, the container includes a film composed of the random propylene/ethylene copolymer which contains the substituted phenylene aromatic diester. The container includes a heat seal. The heat seal seals a first film portion to a second film portion to define a container interior. The first film portion and the second film portion may be components of the same film. Alternatively, the first film portion and the second film portion each may be a component of separate films.

[0007] In an embodiment, a comestible is located in the container interior.

[0008] An advantage of the present disclosure is an improved random propylene/ethylene copolymer.

[0009] An advantage of the present disclosure is an improved film containing the present random propylene/ethylene copolymer.

[0010] An advantage of the present disclosure is an improved heat seal containing the present random propylene/ethylene copolymer.

[0011] An advantage of the present disclosure is the provision of a heat seal layer or film containing the present random propylene/ethylene copolymer having a lower heat seal initiation temperature and/or a lower hot tack initiation temperature when compared to a heat seal layer containing conventional propylene/ethylene copolymer.

[0012] An advantage of the present disclosure is the provision of a heat seal layer containing the present random propylene/ethylene copolymer and having improved heat seal properties.

[0013] An advantage of the present disclosure is the provision of random propylene/ethylene copolymer with a more effective incorporation of ethylene into the polymer backbone, corresponding to less xylene solubles, which leads to improved optical properties in films.

[0014] An advantage of the present disclosure is the provision of a film containing the present random propylene/ethylene copolymer having improved optics, toughness, and stiffness for molded articles made from the same.

[0015] An advantage of the present disclosure is the provision of an article containing a heat seal layer to form an improved pouch or bag for packaging food.