POLYMERS COMPRISING UNITS DERIVED FROM ETHYLENE AND POLYALKENE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of U.S. Provisional Application No. 61/242,137, filed on September 14, 2009, and fully incorporated herein by reference.

BACKGROUND

Conventional low density polyethylene (LDPE) has good processability, however when used in film applications, additives, such as polyisobutylene (PIB) are typically required to impart good cling characteristics such as cling strength or improved adhesion to surfaces. However, these additives when blended by standard extrusion or physical blending techniques often must be added at low levels to avoid phase separation and/or migration in or leaching from the film over time. Accordingly, a need exists for LDPE compositions with good processability, which can also be crosslinked if desired, and that can be used to form films with consistent cling behavior.

SUMMARY ~~OF THE INVENTION~~

In a first aspect, there is provided a polymer comprising a polyalkylene backbone with greater than 100 units and one or more highly branched ethylene based polymeric branches, the polymer having at least 0.15 units of C_5 (amyl) branches per 1000 carbon atoms based on the carbon atoms in the ethylene based polymeric branches, and

wherein the polyalkylene has a weight average molecular weight from 30,000 to 4.1 million g/mole, and

wherein the polymer comprises a majority weight percent of polymerized ethylene based on the weight of the polymer.

In one embodiment, the ~~invention~~disclosure is a polymer comprising units derived from ethylene and polyalkylene, the polymer having at least 0.15 units of amyl groups per 1000 carbon atoms as determined by ^{13}C Nuclear Magnetic Resonance (NMR). The polymer comprises a polyalkylene with ethylene-based polymeric branches. The measure of 0.15 amyl groups per 1000 carbon atoms is based on the number of carbon atoms in the ethylene-based polymeric branches exclusive of the carbon atoms that form a part of the polyalkylene.

In one embodiment, the ~~invention~~disclosure is a process to form a polymer comprising units derived from ethylene and polyalkylene, the process comprising:

A. Contacting at least one polyalkylene with ethylene in the presence of a free-radical initiator in a first reactor or a first part of a multi-part reactor; and

B. Reacting the polyalkylene with additional ethylene in the presence of the free-radical initiator to form an ethylene-based polymeric branch bonded to the polyalkylene in at least one other reactor or a later part of the multi-part reactor.

In a second aspect, there is provided a composition comprising the polymer as defined above.

In a third aspect, there is provided an article comprising at least one component formed from the composition as defined above.