POLYMER FLOW INDEX MODIFIER

Field of Disclosure

[0001] Embodiments of the present disclosure are directed towards modifying a polymer flow index, more specifically, embodiments are directed towards modifying a polymer flow index by utilizing a flow index modifier with a chromium catalyst.

Background

[0002] Polymers may be utilized for a number of products including films and pipes, among other. Polymers can be formed by reacting one or more types of monomer in a polymerization reaction. There is continued focus in the industry on developing new and improved materials and/or methods that may be utilized to form polymers having one or more desirable properties.

Summary

[0003] The present disclosure provides methods for modifying a polymer flow index, including: providing ethylene monomers to a polymerization reactor; providing a chromium catalyst to the polymerization reactor; and providing an active amount of a flow index modifier to the polymerization reactor.

[0003a] In one aspect, the present disclosure refers to a method for modifying a polymer flow index, comprising: providing monomers to a polymerization reactor; providing a supported chromium catalyst to the polymerization reactor; and providing an active amount of a flow index modifier to the polymerization reactor, wherein the flow index modifier is carbon dioxide and is from 0.50 parts per million to 50.00 parts per million based upon the monomers, wherein providing the active amount of the flow index modifier forms a polymer having a density that is reduced as compared to a second polymer having a different density, where the second polymer is formed by a same polymerization process, but without utilizing the active amount of the flow index modifier, and wherein the supported chromium catalyst is a chromium catalyst supported on a calcined support material which has been calcined at a peak temperature from 350 °C to 850 °C.

[0004] The flow index modifier can be selected from carbon dioxide, carbon monoxide, 2,4-hexadiene, and combinations thereof.

[0005] The present disclosure provides that carbon dioxide may be utilized from 0.50 parts per million to 50.00 parts per million based upon the ethylene monomers.

[0006] The present disclosure provides that carbon monoxide may be utilized from 0.010 parts per million to 2.00 parts per million based upon the ethylene monomers.

[0007] The present disclosure provides that 2,4-hexadiene may be utilized from 0.05 parts per million to 5.00 parts per million based upon the ethylene monomers.

[0008] The above summary of the present disclosure is not intended to describe each disclosed example or every implementation of the present disclosure. The description that follows more particularly exemplifies illustrative examples. In several places throughout the application, guidance is provided through lists of examples,

Claims

What is claimed:

1. A method for modifying a polymer flow index, comprising:

providing monomers to a polymerization reactor;

providing a supported chromium catalyst to the polymerization reactor; and

providing an active amount of a flow index modifier to the polymerization reactor, wherein the flow index modifier is carbon dioxide and is from 0.50 parts per million to 50.00 parts per million based upon the monomers,

wherein providing the active amount of the flow index modifier forms a polymer having a density that is reduced as compared to a second polymer having a different density, where the second polymer is formed by a same polymerization process, but without utilizing the active amount of the flow index modifier, and

wherein the supported chromium catalyst is a chromium catalyst supported on a calcined support material which has been calcined at a peak temperature from 350 °C to 850 °C.

2. The method of claim 1, wherein, providing an active amount of the flow index modifier to the polymerization reactor forms a polymer having a polymer flow index that is reduced as compared to a second polymer having a different polymer flow index, where the second polymer is formed by a same polymerization process, but without utilizing an active amount of the flow index modifier.

3. The method of claim 2, wherein, the polymer flow index is reduced from 5 % to 50 % as compared to the second polymer.

4. The method of claim 1, wherein the monomers comprise ethylene.

5. The method of claim 1, comprising forming polyethylene.

6. The method of claim 1, wherein the chromium catalyst is a reduced chromium oxide catalyst.