AN IMPROVED PROCESS FOR PRODUCING PELLETIZED POLYMER COMPOSITIONS

Field of Invention

The instant invention relates to an improved process for producing pelletized polymer compositions, and pelletized polymer compositions.

Background of the Invention

Polymeric materials such as polyolefins, e.g. polyethylene and polypropylene, are typically formed into pellets via an underwater pelletizer. The pelletized polymer form facilitates the transportation of such polymeric materials. However, low viscosity low molecular weight polymeric materials are difficult to pelletize via conventional continuous processes without accruing additional cost.

Therefore, there is a need for an improved process for producing pelletized polymer compositions facilitating the pelletization of low viscosity low molecular weight polymeric materials via conventional continuous processes while limiting any additional cost.

Summary

The instant disclosure provides an improved process for producing pelletized polymer compositions, and pelletized polymer compositions.

In one embodiment, the instant disclosure provides a process for producing a pelletized polymer composition comprising: (1) polymerizing one or more alpha-olefins in one or more solution reactors thereby producing a molten polymer composition comprising one or more solvents; (2) removing at least a portion of said one or more solvents thereby forming a polymer composition having a low solvent content (typically less than 1,000 parts of solvent per million of polymer on a weight basis); (3) removing heat from said polymer composition having low solvent content to a temperature in the range of equal to or greater than the crystallization point of the polymer composition having low solvent content to less than or equal to a temperature in the range of from (the crystallization point of the polymer composition having low solvent content + 20 °C) thereby forming a viscous polymer melt; and (4) pelletizing said viscous polymer melt via an underwater pelletizer thereby forming said pelletized polymer composition.

In one aspect, there is provided process for producing a pelletized polymer composition comprising:

polymerizing one or more alpha-olefins in one or more solution reactors thereby producing a molten polymer composition comprising one or more solvents;

removing at least a portion of said one or more solvents in a devolatilization system thereby forming a polymer composition having a low solvent content of less than 1,000 parts of solvent per million of polymer on a weight basis;

removing heat from said polymer composition having low solvent content in a heat exchanger to a temperature in the range T_c to T_c + 20 °C, thereby forming a viscous polymer melt; where T_c represents the crystallization point of the polymer composition; and

pelletizing said viscous polymer melt via an underwater pelletizer thereby forming said pelletized polymer composition.

In an alternative embodiment, the instant disclosure further provides a pelletized polymer composition produced via the inventive process, wherein each pelletized polymer composition has diameter in the range of from less than 6 mm.

In an alternative embodiment, the instant disclosure provides a process for producing a pelletized polymer composition and a pelletized polymer composition, in accordance with any of the preceding embodiments, except that the alpha-olefin is ethylene, propylene, or combinations thereof.

In an alternative embodiment, the instant disclosure provides a process for producing a pelletized polymer composition and a pelletized polymer composition, in accordance with any of the preceding embodiments, except that the pelletized polymer composition has a viscosity of less than 100,000 cP at 177° C as measured according to ASTM D1084.

Brief Description of the Drawings

For the purpose of illustrating the invention, there is shown in the drawings a form that is exemplary; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

Fig. 1 is a diagram illustrating a first embodiment of the present invention.

Detailed Description of the Invention

The instant invention provides an improved process for producing pelletized polymer compositions, and pelletized polymer compositions.

The process for producing a pelletized polymer composition according to the present invention comprises: (1) polymerizing one or more alpha-olefins in one or more solution reactors thereby producing a molten polymer composition comprising one or more solvents; (2) removing at least a portion of said one or more solvents thereby forming a polymer composition having a low solvent content (typically less than 1,000 parts of solvent per million of polymer on a weight basis); (3) removing heat from said polymer composition having low solvent content to a temperature in the range of equal to or greater than the crystallization point of the polymer composition having low solvent content to less than or equal to a temperature in the range of from (the crystallization point of the polymer composition having low solvent content + 20 °C) thereby forming a viscous polymer melt; and (4) pelletizing said viscous polymer melt via an underwater pelletizer thereby forming said pelletized polymer composition.

We Claim:

1. A process for producing a pelletized polymer composition comprising:

polymerizing one or more alpha-olefins in one or more solution reactors thereby producing a molten polymer composition comprising one or more solvents;

removing at least a portion of said one or more solvents in a devolatilization system thereby forming a polymer composition having a low solvent content of less than 1,000 parts of solvent per million of polymer on a weight basis;

removing heat from said polymer composition having low solvent content in a heat exchanger to a temperature in the range T_c to $T_c + 20$ °C, thereby forming a viscous polymer melt; where T_c represents the crystallization point of the polymer composition; and

pelletizing said viscous polymer melt via an underwater pelletizer thereby forming said pelletized polymer composition.

2. The process of claim 1, for producing a pelletized polymer composition, wherein said alpha-olefin is ethylene, propylene, or combinations thereof.