CLAIMS:

1. Pellets of unadulterated brominated anionic styrenic polymer having the following characteristics:

A) a bromine content of at least 50 wt%;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 70 wt% of the pellets are retained on a standard US No. 40 sieve and no more than 30 wt% are retained on a standard US No. 5 sieve.

2. The pellets of claim 1, wherein said pellets are prepared by a process for recovering brominated styrenic polymer from admixture in a vaporizable organic solvent, which process comprises converting in a devolatilization extruder the admixture of brominated styrenic polymer into a brominated styrenic polymer melt or flow and a separate vapor phase comprised predominately of vaporizable solvent, recovering said melt or flow of brominated styrenic polymer while in the form of a melt or flow from the devolatilization extruder, and allowing or causing said melt or flow to solidify.

3. The pellets of claim 2, wherein the process by which said pellets are prepared comprises

continuously introducing into the liquids inlet portion of an operating devolatilization extruder, an admixture of extrudable viscosity, said admixture comprising brominated styrenic polymer and a vaporizable organic solvent, said extruder having a liquids inlet portion and a polymer melt or polymer flow outlet portion and at least two sections that can be operated (a) at temperatures that differ from each other, and (b) under pressures that differ from each other, one of the at least two sections being disposed upstream from the other of the at least two sections, the devolatilization extruder having vapor collecting apparatus adapted to collect volatiles formed in these at least two sections; and

operating said section disposed downstream at higher temperature and lower pressure conditions than the temperature and pressure conditions of said section disposed upstream, so that (a) a flow or melt of said polymer is formed within the devolatilization extruder and released from the polymer melt or polymer flow outlet, and (b) volatiles composed predominately of the solvent released from the polymer in said at least two sections can be, and preferably are, collected by said vapor collecting apparatus, the melt or flow of such brominated styrenic polymer that has exited from the outlet portion of the devolatilization extruder containing an average of less than 10,000 ppm (wt/wt) of the organic solvent in steady-state operation.

4. The pellets of claim 1, wherein said pellets are prepared by a process for producing pelletized brominated styrenic polymer from admixture in a vaporizable organic solvent, which process comprises converting in a devolatilization extruder an admixture of brominated styrenic polymer of extrudable viscosity into a

brominated styrenic polymer melt or flow and a separate vapor phase comprised predominately of vaporizable solvent, recovering said melt or flow of brominated styrenic polymer while in the form of a melt or flow from the devolatilization extruder, allowing or causing said melt or flow to solidify, and converting solidified melt or flow into pellets.

5. The pellets of Claim 4 wherein, in said process by which said pellets are prepared, said melt or flow is allowed or caused to solidify by passing said melt or flow from said devolatilization extruder through a die thereby producing emerging strands of brominated styrenic polymer melt or flow, allowing or causing said strands to solidify, and subdividing the strands into solidified pellets of brominated styrenic polymer.

6. The pellets of Claim 5 wherein in said process by which said pellets are prepared, said strands that are allowed or caused to solidify are enabled and/or caused to be broken, subdivided, or otherwise converted into pellets of the brominated styrenic polymer; and wherein the pellets are subjected to size classification to remove and recover from such product (a) oversized particles, if any, and (b) fines, if any, that may be present in such product.

7. The pellets of claim 1, wherein said pellets are prepared by a process which includes the preparation of a brominated styrenic polymer in the form of a melt or polymer flow, which process comprises:

brominating a styrenic polymer under superatmospheric pressure in a vaporizable solvent and in the presence of a Lewis acid bromination catalyst, and in a closed reaction system in which substantially all of the hydrogen halide coproduct is retained in the reaction mixture;

quenching the catalyst to thereby form (i) an organic phase containing dissolved brominated styrenic polymer and (ii) an aqueous phase containing hydrogen halide;

separating phases (i) and (ii) from each other, and if phase (i) has a viscosity less than extrudable viscosity, concentrating organic phase of (i) to form an admixture of extrudable viscosity;

continuously introducing organic phase of (i) or admixture of extrudable viscosity into the liquids inlet portion of an operating devolatilization extruder having a liquids inlet portion and a polymer melt or polymer flow outlet portion and at least two sections that can be operated (a) at temperatures that differ from each other, and (b) under pressures that differ from each other, one of the at least two sections being disposed upstream from the other of the at least two sections, the devolatilization extruder having vapor collecting apparatus adapted to collect volatiles formed in these at least two sections; and

operating said section disposed downstream at higher temperature and lower pressure conditions than the temperature and pressure conditions of said section disposed upstream, so that (a) a flowable polymer melt or polymer flow of said polymer is formed within the devolatilization extruder and released from the at least

one polymer melt or polymer flow outlet, and (b) volatiles composed predominately of the solvent released from the polymer in said at least two sections are collected by said vapor collecting apparatus, the polymer melt or polymer flow of such brominated styrenic polymer leaving from the outlet portion of the devolatilization extruder during steady-state operation of the devolatilization extruder containing an average of less than 10,000 ppm (wt/wt) of the organic solvent used in the process.

8. The pellets of claim 1, wherein said pellets are prepared by a process for the preparation of a brominated styrenic polymer in pelletized form, which process comprises:

brominating a styrenic polymer under superatmospheric pressure in a vaporizable organic solvent and in the presence of a Lewis acid bromination catalyst, and in a closed reaction system in which substantially all of the hydrogen halide coproduct is retained in the reaction mixture;

deactivating the catalyst with water to thereby form (i) an organic phase containing dissolved brominated styrenic polymer and (ii) an aqueous phase containing hydrogen halide;

separating phases (i) and (ii) from each other, and if phase (i) has a viscosity less than extrudable viscosity, concentrating organic phase of (i) to form an admixture of extrudable viscosity;

continuously introducing organic phase of (i) or admixture of extrudable viscosity into the liquids inlet portion of an operating devolatilization extruder having a liquids inlet portion and a polymer melt or polymer flow outlet portion and at least two sections that can be operated (a) at temperatures that differ from each other, and (b) under pressures that differ from each other, one of the at least two sections being disposed upstream from the other of the at least two sections, the devolatilization extruder having vapor collecting apparatus adapted to collect volatiles formed in these at least two sections; and

operating said section disposed downstream at higher temperature and lower pressure conditions than the temperature and pressure conditions of said section disposed upstream, so that (a) a flowable polymer melt or polymer flow of said polymer is formed within the devolatilization extruder and can leave from the at least one polymer melt or polymer flow outlet, and (b) volatiles composed predominately of the solvent released from the polymer in said at least two sections are collected by said vapor collecting apparatus;

having said polymer melt or polymer flow leaving the devolatilization extruder pass through a die to produce one or more traveling continuous strands of extruded polymer melt or polymer flow;

enabling and/or causing such continuous traveling strand(s) to solidify and be broken, subdivided, or otherwise converted into pellets of the brominated styrenic polymer.

9. The pellets of claim 1, wherein said pellets are prepared by a process for producing pelletized brominated styrenic polymer, which process comprises:

feeding an admixture of extrudable viscosity comprising brominated styrenic polymer and a vaporizable solvent into a devolatilization extruder that is adapted and operated to separate vaporizable solvent from said polymer and form as extrudate a polymer melt or polymer flow of said polymer;

having the extrudate pass through a die to thereby form one or more traveling strands of molten unadulterated brominated styrenic polymer; and

pelletizing such strands by enabling and/or causing such traveling strand(s) to solidify and be broken, subdivided, or otherwise converted into pellets of the brominated styrenic polymer; and

subjecting the pellets to size classification to remove and recover from such product (a) oversized particles, if any, and (b) fines, if any, that may be present in such product.

10. The pellets of Claim 9 wherein, in said process by which said pellets are prepared:

said feeding is conducted by continuously introducing an admixture of extrudable viscosity comprising brominated styrenic polymer and a vaporizable organic solvent, into the liquids inlet portion of an operating devolatilization extruder having a liquids inlet portion and a polymer melt or polymer flow outlet portion and at least two sections that can be operated (a) at temperatures that differ from each other, and (b) under pressures that differ from each other, one of the at least two sections being disposed upstream from the other of the at least two sections, the devolatilization extruder having vapor collecting apparatus adapted to collect volatiles formed in these at least two sections;

said section that is disposed downstream is operated at higher temperature and lower pressure conditions than the temperature and pressure conditions of said section that is disposed upstream, so that (a) a flowable melt or flow of said polymer is formed within the devolatilization extruder and forcibly released from the polymer melt or polymer flow outlet, and (b) volatiles composed predominately of the solvent released from the polymer in said at least two sections can be collected by said vapor collecting apparatus, the polymer melt or polymer flow of such brominated styrenic polymer that exits from the outlet portion of the devolatilization extruder containing an average of less than 10,000 ppm (wt/wt), said polymer melt or polymer flow of such brominated styrenic polymer that exits from the outlet portion of the devolatilization extruder being the extrudate that passes through said die to thereby form said one or more traveling strands of molten unadulterated brominated styrenic polymer.

11. The pellets of any of Claims 7-8 wherein, in said process by which said pellets are prepared, the styrenic polymer that is to be brominated in the process is at least one anionic styrenic polymer having a GPC weight average molecular weight

(M_w) in the range of 2000 to 200,000 and a GPC polydispersity in the range of 1 to 2, wherein the brominated anionic styrenic polymer formed in said process has a bromine content of at least 50 wt%.

12. The pellets of Claim 11 wherein, in said process by which said pellets are prepared, said GPC weight average molecular weight (M_w) is in the range of 3000 to 10,000 and said bromine content is at least 60 wt%.

13. The pellets of Claim 12 wherein, in said process by which said pellets are prepared, said GPC weight average molecular weight (M_w) is in the range of 3000 to 7000 and said bromine content is at least 67 wt%.

14. The pellets of any of Claims 7-8 wherein, in said process by which said pellets are prepared, the styrenic polymer that is brominated in the process is at least one free-radically produced styrenic polymer having a GPC weight average molecular weight (M_w) in the range of 30,000 to 500,000 and a GPC polydispersity in the range of 1 to 10, and wherein the brominated styrenic polymer formed in said process has a bromine content of at least 50 wt%.

15. The pellets of Claim 14 wherein, in said process by which said pellets are prepared, said GPC weight average molecular weight (M_w) is in the range of 50,000 to 300,000 and said bromine content is at least 60 wt%.

16. The pellets of Claim 15 wherein, in said process by which said pellets are prepared, said GPC weight average molecular weight (M_w) is in the range of 150,000 to 250,000 and said bromine content is at least 67 wt%.

17. The pellets of any of Claims 2-10 wherein, in said process by which said pellets are prepared, said brominated styrenic polymer is a brominated anionic styrenic polymer.

18. The pellets of any of Claims 2-10 wherein, in said process by which said pellets are prepared, said brominated styrenic polymer is a brominated polystyrene polymer.

19. The pellets of any of Claims 2-10 wherein, in said process by which said pellets are prepared, said brominated styrenic polymer is a brominated anionic polystyrene polymer.

20. Granules or pastilles of unadulterated brominated anionic styrenic polymer, wherein said granules or pastilles are prepared by a process comprising:

converting in a devolatilization extruder, an admixture of brominated styrenic polymer and a vaporizable organic solvent into a melt or flow of brominated anionic styrenic polymer and a separate vapor phase of said solvent; and

forming from said melt or flow a downwardly oriented plug flow from at least one orifice in a manifold or nozzle that is in proximity to a cooled traveling planar member, said planar member being impervious to cooling liquid and having an upper and lower surface, whereby there is a gap between the lower portion of the

orifice and said upper surface, so that at least a portion of a plug of molten unadulterated brominated anionic styrenic polymer either (i) bridges said gap and forms a separate individual granule or pastille on the upper surface of said planar member, or (ii) freely drops from the lower portion of the orifice and falls upon the upper surface of said planar member and forms an individual granule or pastille on the upper surface of said planar member, said traveling member being cooled by a mist or spray of cooling liquid contacting the lower surface of said planar member; wherein said granules or pastilles have an average crush strength in the Crush Strength Test of at least 28 pounds per square inch.

21. Granules or pastilles of unadulterated brominated anionic styrenic polymer, wherein said granules or pastilles are prepared by a process comprising:

brominating an anionic styrenic polymer under superatmospheric pressure in a vaporizable solvent and in the presence of a Lewis acid bromination catalyst, and in a closed reaction system in which substantially all of the hydrogen halide coproduct is retained in the reaction mixture;

quenching the catalyst to thereby form (i) an organic phase containing dissolved brominated styrenic polymer and (ii) an aqueous phase containing hydrogen halide;

separating phases (i) and (ii) from each other, and if phase (i) has a viscosity less than extrudable viscosity, concentrating organic phase of (i) to form an admixture of extrudable viscosity;

continuously introducing organic phase of (i) or admixture of extrudable viscosity into the liquids inlet portion of an operating devolatilization extruder having a liquids inlet portion and a polymer melt or polymer flow outlet portion and at least two sections that can be operated (a) at temperatures that differ from each other, and (b) under pressures that differ from each other, one of the at least two sections being disposed upstream from the other of the at least two sections, the devolatilization extruder having vapor collecting apparatus adapted to collect volatiles formed in these at least two sections;

operating said section disposed downstream at higher temperature and lower pressure conditions than the temperature and pressure conditions of said section disposed upstream, so that (a) a flowable polymer melt or polymer flow of said polymer is formed within the devolatilization extruder and released from the at least one polymer melt or polymer flow outlet, and (b) volatiles composed predominately of the solvent released from the polymer in said at least two sections are collected by said vapor collecting apparatus;

forming from said flowable polymer melt or polymer flow of said polymer a downwardly oriented plug flow from at least one orifice in a manifold or nozzle that is in proximity to a cooled traveling planar member, said planar member being impervious to cooling liquid and having an upper and lower surface, whereby there is a gap between the lower portion of the orifice and said upper surface, so that at least a portion of a plug of molten unadulterated brominated anionic styrenic polymer either (i) bridges said gap and forms a separate individual granule or pastille on the upper surface of said planar member, or (ii) freely drops from the

lower portion of the orifice and falls upon the upper surface of said planar member and forms an individual granule or pastille on the upper surface of said planar member, said traveling member being cooled by a mist or spray of cooling liquid contacting the lower surface of said planar member; wherein said granules or pastilles have an average crush strength in the Crush Strength Test of at least 28 pounds per square inch.

CLAIMS

1. Pellets of unadulterated brominated anionic styrenic polymer having the following characteristics:

A) a bromine content of at least 50 wt%;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 70 wt% of the pellets are retained on a standard US No. 40 sieve and no more than 30 wt% are retained on a standard US No. 5 sieve.

2. Pellets as in claim 1 wherein said brominated anionic styrenic polymer is a brominated anionic polystyrene.

3. Pellets as in claim 1 having the following characteristics:

A) a bromine content of at least 60 wt %;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 75 wt % of the pellets are retained on a standard US No. 40 sieve and no more than 25 wt % are retained on a standard US No. 5 sieve.

4. Pellets as in claim 3 wherein said brominated anionic styrenic polymer is a brominated anionic polystyrene.

5. Pellets of unadulterated brominated anionic styrenic polymer as in claim 3 wherein said pellets comprise:

A) a bromine content of at least 50 wt %;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 70 wt % of the pellets are retained on a standard US No. 40 sieve and no more than 30 wt % are retained on a standard US No. 5 sieve.

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6. Pellets as in claim 1 having the following characteristics:

A) a bromine content of at least 67 wt %;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 75 wt % of the pellets are retained on a standard US No. 40 sieve and no more than 25 wt % are retained on a standard US No. 5 sieve.

7. Pellets as in claim 6 wherein said brominated anionic styrenic polymer is a brominated anionic polystyrene.

8. Pellets as in claim 5 wherein said brominated anionic styrenic polymer is a brominated anionic polystyrene.

9. Pellets as in claim 5 having the following characteristics:

A) a bromine content of at least 67 wt %;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 75 wt % of the pellets are retained on a standard US No. 40 sieve and no more than 25 wt % are retained on a standard US No. 5 sieve.

10. Pellets as in claim 9 wherein said brominated anionic styrenic polymer is a brominated anionic polystyrene.

11. A process for producing pelletized brominated styrenic polymer, which process comprises:

feeding an admixture of extrudable viscosity comprising brominated styrenic polymer and a vaporizable solvent into a devolatilization extruder that is adapted and operated to separate vaporizable solvent from said polymer and form as extrudate a polymer melt or polymer flow of said polymer;

having the extrudate pass through a die to thereby form one or more traveling strands of molten unadulterated brominated styrenic polymer; and

pelletizing such strands by enabling and/or causing such traveling strand(s) to solidify and be broken, subdivided, or otherwise converted into pellets of the brominated styrenic polymer; and

subjecting the pellets to size classification to remove and recover from such product (a) oversized particles, if any, and (b) fines, if any, that may be present in such product.

12. Pellets of unadulterated brominated anionic styrenic polymer produced by the method of claim 11.

13. Pellets as in claim 12 having the following characteristics:

A) a bromine content of at least 60 wt %;

B) an average crush strength in the Crush Strength Test of at least 28 pounds per square inch;

C) a particle size range in which at least 75 wt % of the pellets are retained on a standard US No. 40 sieve and no more than 25 wt % are retained on a standard US No. 5 sieve.

14. Pellets as in claim 13 wherein said brominated anionic styrenic polymer is a brominated anionic polystyrene.

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