What is claimed is:

1. A system for solution polymerization comprising:

a reactor system that is operative to receive at least one monomer in a solvent and to react the monomer to form a polymer;

a plurality of devolatilization vessels located downstream of the reactor system, where each devolatilization vessel operates at a lower pressure than the preceding devolatilization vessel and wherein the plurality of devolatilization vessels receives a polymer solution from the reactor system; and

a first heat exchanger disposed between two devolatilization vessels and in fluid communication with them, where the first heat exchanger has an inlet port temperature of 120°C to 230°C, an outlet port temperature of 200°C to 300°C, an inlet port pressure of 35 to 250 kgf/cm^2 and an outlet port pressure of 20 to 200 kgf/cm^2; and wherein the polymer solution remains in a single phase during its residence in the first heat exchanger.

2. The system of Claim 1, further comprising a distributor disposed in at least one devolatilization vessel, wherein the distributor comprises:

a first conduit; where the first conduit has an inlet port for charging a heating fluid into the distributor;

a second conduit; where the first conduit lies inside the second conduit to define a first annular space therebetween; where the second conduit has an exit port for removing the heating fluid from the distributor; and

a plurality of plate stacks disposed around the second conduit to define a second annular space from top to bottom of the distributor; where each plate stack comprises a plurality of plates; where the plurality of plates further define a plurality of conduits, each conduit having a varying width over its length and extending radially outwards from the central passage, where the plurality of conduits is in fluid communication with the second annular space; and where the distributor is operated at a pressure and a temperature effective to promote separation of a solvent from a polymer solution during transport of the polymer solution through the distributor.

3. The system of Claim 1, wherein each successive stack in the plurality of plate stacks has a smaller inner diameter than a preceding stack from top to bottom.

4. The system of Claim 1, wherein the reactor system comprises a plurality of reactors and where at least one reactor operates under isothermal conditions or under adiabatic conditions.

5. The system of Claim 1, further comprising a tubular reactor in fluid communication with the reactor system; wherein the tubular reactor may optionally receive additional monomer, comonomer, and catalyst and wherein the tubular reactor further increases the polymer concentration via further reaction of unreacted or optionally the additional monomer and/or comonomer.

6. The system of Claim 1, further comprising a positive displacement pump located downstream of the reactor system and in fluid communication with the reactor system, where the positive displacement pump increases a stream pressure to 50 to 150 kgf/cm^2.

7. The system of Claim 6, further comprising a heat exchanger disposed between the positive displacement pump and the first devolatilization vessel and in fluid communication with the first devolatilization vessel, where the heat exchanger has an inlet port temperature of 100°C to 230°C, an outlet port temperature of 230°C to 280°C, an inlet port pressure of 40 to 170 kgf/cm^2 and an outlet port pressure of 30 to 150 kgf/cm^2, where the polymer solution is kept in one or two liquid phases.

8. The system of Claim 1, further comprising a pressure regulating device disposed between each heat exchanger and subsequent devolatilization vessel, where the pressure regulating device ensures the polymer solution is kept in one or two liquid phases in the heat exchanger and facilitates removal of a portion of the solvent in a succeeding devolatilization vessel.

9. The system of Claim 1, wherein the reactor system comprises a loop reactor or a continuous stirred tank reactor that operates at a pressure of greater than 40 kgf/cm^2 and at a temperature of 130 to 210°C.

~~10. The system of Claim 1, further comprising a positive displacement pump located between a first and second devolatilization vessel of the plurality of devolatilization vessels and in fluid communication with them, where the positive displacement pump has an inlet pressure of 2 to 12 kgf/cm^2 and an outlet port pressure of 35 to 150 kgf/cm^2.~~

~~11. The system of Claim 1, wherein the polymer solution leaving the reactor system has a polymer concentration of 10 to 40 percent by weight, where all the weight percent values are based on a total weight of the polymer solution.~~

~~12~~10. The system of Claim 1, wherein the plurality of devolatilization vessels comprises at least two devolatilization vessels and where the first heat exchanger is disposed between a first devolatilization vessel and a second devolatilization vessel.

~~13~~11. The system of Claim ~~12~~ 10, wherein a second heat exchanger is disposed between the second devolatilization vessel and a third devolatilization vessel.

~~14. The system of Claim 12, wherein a pressure in the first devolatilization vessel is maintained at 2 to 12 kgf/cm^2 and a polymer concentration in a polymer solution leaving the first devolatilization vessel is 50 to 70 wt%, based on a total weight of the polymer solution.~~

~~15. The system of Claim 14, wherein a pressure in the second devolatilization vessel is 0.1 to 1.0 kgf/cm^2 and the polymer concentration in the polymer solution is increased to at least 90 wt%, based on a total weight of the polymer solution; where the second devolatilization vessel lies downstream of the first devolatilization vessel.~~

~~16. The system of Claim 15, wherein a pressure in the third devolatilization vessel is 0.001 to 0.040 kgf/cm^2 and the polymer concentration in the polymer solution is increased to at least 99.8 wt%, based on a total weight of the polymer solution.~~

~~17~~12. The system of Claim 2, where the distributor, the heat exchanger and a pressure regulating device are combined into a single piece of equipment .

~~18~~13. A method comprising:

charging a reactor system with a monomer, a solvent and a catalyst;

reacting the monomer to form a polymer; wherein the reaction to form the polymer is conducted either adiabatically or isothermally and wherein the polymer is dispersed in a polymer solution;

discharging the polymer solution from the reactor system to a plurality of devolatilization vessels located downstream of the reactor system; wherein each devolatilization vessel operates at a lower pressure than the preceding devolatilization vessel; and

discharging the polymer solution from at least one devolatilization vessel to a first heat exchanger; and

heating the polymer solution in the heat exchanger; where the heat exchanger receives the polymer solution at an inlet port temperature of 120°C to 230°C, an outlet port temperature of 200°C to 300°C, an inlet port pressure of 35 to 250 kgf/cm^2 and an outlet port pressure of 20 to 200 kgf/cm^2; and wherein the polymer solution remains in a single phase during its residence in the first heat exchanger.

~~19~~14. The method of Claim ~~18~~ 13, further comprising:

separating the polymer from the polymer solution in a distributor contained in at least one devolatilization vessel; wherein the distributor comprises:

a first conduit; where the first conduit has an inlet port for charging a heating fluid into the distributor;

a second conduit; where the first conduit lies inside the second conduit to define a first annular space therebetween; where the second conduit has an exit port for removing the heating fluid from the distributor;

a plurality of plate stacks disposed around the second conduit to define a second annular space from top to bottom of the distributor; where each plate stack comprises a plurality of plates; where the plurality of plates further define a plurality of conduits, each conduit having a varying width over its length and extending radially outwards from the central passage, where the plurality of conduits is in fluid communication with the second annular space; and where the distributor is operated at a pressure and a temperature effective to promote separation of a solvent from the polymer solution during transport of the polymer solution through the distributor; and

discharging a polymer from the plurality of devolatilization vessels to a pelletization, granulation or solidification device; where the polymer contains less than 300 parts per million of volatiles.

~~20~~15. The method of Claim ~~18~~ 13, further comprising discharging the polymer solution to a tubular reactor located downstream of the reactor system and increasing the polymer solution temperature and polymer concentration in the tubular reactor.