What is claimed is:

1. A system for solution polymerization comprising:

a reactor system that is operative to receive a monomer, a catalyst and a solvent, and to react the monomer to form a polymer;

a pre-heater located downstream of the reactor system, where the pre-heater is operative to receive a polymer solution from the reactor system and to heat the polymer solution to a temperature greater than its lower critical solution temperature;

a liquid-liquid separator that is operative to receive a polymer solution from the pre-heater and to facilitate a separation between the polymer and volatiles by reducing the pressure and/or the temperature of the polymer solution to below the lower critical solution temperature of the polymer solution; where the monomer content in the polymer solution entering the liquid-liquid separator is greater than 5 wt% of a total weight of the polymer solution; and where the polymer is present in a polymer-rich phase and the volatiles are present in a solvent-rich phase; and

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 the polymer-rich phase from the reactor system and separates polymer from the volatiles.

2. The system of Claim 1, where the reactor system comprises a first reactor that operates at a temperature of 120°C to 230°C and a pressure of greater than or equal to 90 kgf/cm^2 to less than or equal to 200 kgf/cm^2.

3. The system of Claim 2, where the solids content in the polymer solution is present in an amount of 8 to 16 wt%, based on a total weight of the polymer solution at the exit of the first reactor.

4. The system of Claim 2, where the reactor system further comprises a second reactor that operates at a higher temperature and a lower pressure than the first reactor.

5. The system of Claim 4, where the second reactor operates at a pressure of greater than or equal to 80 kgf/cm^2 to less than or equal to 180 kgf/cm^2 and a temperature of 190 to 230ºC.

6. The system of Claim 5, where the solids content in the polymer solution is present in an amount of 12 to 20 wt%, based on a total weight of the polymer solution at the exit of the second reactor.

7. The system of Claim 1, where the pressure and/or temperature in the liquid-liquid separator remains above the bubble point of the polymer solution.

8. The system of Claim 1, where a pressure of the polymer solution in the liquid-liquid separator is reduced to less than 65 kgf/cm^2 from 180 kgf/cm^2 and where a solids content of the polymer solution emanating from the liquid-liquid separator is 20 to 24 wt%.

9. The system of Claim 1, where the a plurality of devolatilization vessels comprises a first devolatilization vessel that is operative to increase solids content in the polymer stream to at least 60 wt% polymer, based on a total weight of the polymer-rich phase leaving the first devolatilization vessel.

10. The system of Claim 1, where the a plurality of devolatilization vessels further comprises a second devolatilization vessel that is operative to increase solids content in the polymer stream to at least 90 wt% polymer, based on a total weight of the polymer-rich phase leaving the second devolatilization vessel.

11. The system of Claim 1, where the volatiles generated in the plurality of devolatilization vessels are recycled back to the reactor system.

12. The system of Claim 1, where the monomer is an α-olefin.

13. The system of Claim 12, where the α-olefin is ethylene.

14. A method comprising:

charging to a reactor system a feed stream comprising a catalyst, a monomer and a solvent;

reacting the monomer to form a polymer; where the polymer is contained in a single phase polymer solution;

transporting the polymer solution to a pre-heater to increase the temperature of the polymer solution;

charging the polymer solution to a liquid-liquid separator;

reducing a pressure of the polymer solution in the liquid-liquid separator and separating a polymer-rich phase from a solvent-rich phase in the liquid-liquid separator;

transporting the polymer-rich phase to a plurality of devolatilization vessels located downstream of the liquid-liquid separator, where each devolatilization vessel operates at a lower pressure than the preceding devolatilization vessel; and

separating the polymer from volatiles present in the polymer rich phase.

15. The method of Claim 14, further comprising pelletizing the polymer and recycling volatiles to the reactor system.