CLAIMS

What is claimed is:

1. A polymerization reactor system comprising:

a mixer to contact a substantially continuous feed of chromium-based catalyst to a polymerization reactor with a reducing agent to form a catalyst feed composition comprising the chromium-based catalyst;

a polymerization reactor to receive the catalyst feed composition and to polymerize an olefin into a polyolefin in presence of the chromium-based catalyst and

a control system to adjust an addition rate of the reducing agent to the mixer to give a desired flow index of the polyolefin.

2. The system of claim 1, wherein the polymerization reactor comprises a gas phase reactor, and wherein the mixer comprises a static mixer or a stirred mixer, or a combination thereof.

3. The system of claim 1, wherein the control system is configured to adjust the addition rate of the reducing agent to maintain a molar ratio of the reducing agent to the chromium-based catalyst to give the desired flow index of the polyolefin.

4. The system of claim 1, wherein the control system is configured to modulate an addition rate of a solvent to the mixer, and wherein a residence time of the chromium-based catalyst through the mixer is in a range of 2 minutes to 120 minutes.

5. The system of claim 1, wherein the chromium-based catalyst comprises an inorganic support comprising a surface area of 50 to 1000 square meters per gram and an average particle size of 20 to 300 micrometers.

6. The system of claim 1, wherein the control system is configured to adjust an addition rate of a solvent to the mixer in response to operating conditions of the polymerization reactor or in response to a measured flow index of the polyolefin.

7. The system of claim 1, wherein the control system is configured to adjust an addition rate of a solvent to the mixer in response to a change in a feed rate of the chromium-based catalyst to maintain substantially constant a residence time of the chromium-based catalyst through the mixer.