CLAIMS

What is claimed is:

1. A method of treating a chromium-based catalyst for polyolefin production, the method comprising:

adding a charge of chromium-based catalyst to a mix vessel;

introducing a reducing agent into the mix vessel through a conduit extension that extends at least 0.5 inch into the mix vessel and terminates in a designated vapor space of the mix vessel; and

agitating a mixture of the chromium-based catalyst, reducing agent, and a solvent in the mix vessel to disperse the reducing agent in the mixture to promote reaction of the reducing agent with the chromium-based catalyst to give a reduced chromium-based catalyst.

2. The method of claim 1, wherein the conduit extension is an insert through a nozzle of the mix vessel.

3. The method of claim 1, wherein the conduit extension directs the reducing agent toward a surface of the mixture level in the mix vessel.

4. The method of claim 1, wherein the conduit extension directs the reducing agent toward a location of the mixture level in a range of 20% to 80% of a perpendicular distance from a vertical centerline of the mix vessel to an inside surface of a wall of the mix vessel.

5. The method of claim 1, wherein the chromium-based catalyst comprises an activated chromium-based catalyst on an unmilled support, and wherein the reducing agent comprises an organoaluminum compound.

6. The method of claim 1, comprising polymerizing an olefin into a polyolefin in presence of the reduced chromium-based catalyst in a polymerization reactor.

7. The method of claim 1, wherein the chromium-based catalyst comprises an inorganic oxide support having a pore volume of about 0.5 to about 6.0 cubic centimeters (cm3)/gram (g) and a surface area of about 200 to about 600 square meters (m2)/g.

8. The method of claim 1, comprising maintaining a level of the mixture in the mix vessel at an impeller region of a shaft of an agitator of the mix vessel.