CLAIMS:

1. An olefin polymerization catalyst system comprising a silica support, a catalyst precursor compound, and an activator, the silica support comprising a plurality of silica gel particles, wherein:
   each particle comprises a rigid network of amorphous silica;
   the particles are spherical, single gel particles;
   the particles have an average aspect ratio of about 1.2 or less;
   the particles have an average pore volume of from about 1.4 ml/g to about 3 ml/g;
   the particles have an average surface area from about 200 m^2/g to about 950 m^2/g; and
   the particles have a median particle size from about 4 μm to about 100 μm.

2. The olefin polymerization catalyst system of claim 1, wherein at least 75% of particles have an aspect ratio of about 1.2 or less.

3. The olefin polymerization catalyst system of claim 1, wherein at least 50% of particles have an aspect ratio of about 1.1 or less.

4. The olefin polymerization catalyst system of claim 1, wherein the catalyst precursor compound comprises a metallocene component.

5. The olefin polymerization catalyst system of claim 1, wherein the activator comprises an organoaluminum compound.

6. The olefin polymerization catalyst system of claim 1, wherein the activator comprises an aluminoxane.

7. The olefin polymerization catalyst system of claim 1, wherein the activator comprises a borane or borate.

8. The olefin polymerization catalyst system of claim 1, wherein the number percentage of silica particles having a particle size of 1 μm or less is about 1% or less and/or a median particle size of from about 5 μm to about 60 μm.

9. The olefin polymerization catalyst system of claim 1, wherein the silica particles have not

undergone spray drying agglomeration.

10. The olefin polymerization catalyst system of claim 1, wherein the silica particles have an average pore size of from about 30 Angstrom to about 300 Angstrom.

11. The olefin polymerization catalyst system of claim 1, wherein the silica particles have a span of about 1.5 or less and/or a span of 0.9 or greater.

12. The olefin polymerization catalyst system of claim 1, wherein the activator comprises an organoaluminum compound and is loaded on the support such that the catalyst system contains from about 10 wt.% Al or greater.

13. The olefin polymerization catalyst system of claim 1, wherein the particles have an average pore volume greater than 2.3 ml/g and an average pore diameter greater than 350 m^2/g.

14. An olefin polymerization catalyst system comprising a silica support and a chromium compound, the silica support comprising a plurality of silica gel particles, wherein:
each particle comprises a rigid network of amorphous silica;
the particles are spherical, single gel particles;
the particles have an average aspect ratio of about 1.2 or less;
the particles have an average pore volume of from about 1.4 ml/g to about 3 ml/g;
the particles have an average surface area from about 200 m^2/g to about 950 m^2/g; and
the particles have a median particle size from about 4 μm to about 100 μm.

15. An olefin polymerization catalyst system comprising a silica support, a magnesium halide, a transition metal compound, a cocatalyst, and an electron donor compound, the silica support comprising a plurality of silica gel particles, wherein:
each particle comprises a rigid network of amorphous silica;
the particles are spherical, single gel particles;
the particles have an average aspect ratio of about 1.2 or less;
the particles have an average pore volume of from about 1.4 ml/g to about 3 ml/g;
the particles have an average surface area from about 200 m^2/g to about 950 m^2/g; and
the particles have a median particle size from about 4 μm to about 100 μm.

16. A process for polymerizing an olefin comprising, contacting an olefin monomer with a catalyst system comprising a silica support and a catalyst precursor compound to form polyolefin particles, the silica support comprising a plurality of silica gel particles, wherein:

each particle comprises a rigid network of amorphous silica;

the particles are spherical, single gel particles;

the particles have an average aspect ratio of about 1.2 or lower;

the particles have an average pore volume of from about 1.4 ml/g to about 3 ml/g;

the particles have an average surface area from about 200 m^2/g to about 950 m^2/g; and

the particles have a median particle size from about 4 μm to about 100 μm.

17. The process of claim 16, wherein the resulting polyolefin particles have a particle size distribution such that the number percent of particles having a particle size of 1 μm or less is about 1% or less.

18. The process of claim 16, wherein the olefin is polymerized in a gas phase reactor.

19. The process of claim 16, wherein the polyolefin particles have a settled bulk density greater than 0.4 g/cc.

20. The process of claim 16, wherein the polyolefin particles have an aspect ratio of about 1.2 or less.