CLAIMS:

1. A plurality of porous ceramic particles comprising:

an average porosity of at least 0.01 cc/g and not greater than 1.60 cc/g; and

an average particle size of at least 200 microns and not greater than 4000 microns,

wherein the plurality of porous ceramic particles are formed by a spray fluidization forming process operating in a batch mode comprising a first batch spray fluidization forming cycle,

wherein the first batch spray fluidization forming cycle comprises repeatedly dispensing finely dispersed droplets of a first coating fluid onto air borne porous ceramic particles,

wherein the ceramic particles comprise a core region composition,

wherein the first coating fluid comprises a first coating material composition; and

wherein the first coating material composition is different than the core region composition;

wherein the first coating material composition is changed gradually for a portion of or throughout a duration of the first batch spray fluidization forming cycle by gradually changing the concentration of a material in the first coating material composition from a first concentration of the material at a beginning of the first batch spray fluidization forming cycle to a second concentration of the material at an end of the first batch spray fluidization forming cycle.

2. A method of forming a batch of porous ceramic particles, wherein the method comprises:

preparing an initial batch of ceramic particles having an initial particle size distribution span IPDS equal to $(Id_{90}-Id_{10})/Id_{50}$, where Id_{90} is equal to a d_{90} particle size distribution measurement of the initial batch of ceramic particles, Id_{10} is equal to a d_{10} particle size distribution measurement of the initial batch of ceramic particles and Id_{50} is equal to a d_{50} particle size distribution measurement of the initial batch of ceramic particles; and

forming the initial batch into a processed batch of porous ceramic particles using a spray fluidization forming process comprising a first batch spray fluidization forming cycle, the processed batch of porous ceramic particles having a processed particle size distribution span PPDS equal to $(Pd_{90}-Pd_{10})/Pd_{50}$, where Pd_{90} is equal to a d_{90} particle size distribution

measurement of the processed batch of porous ceramic particles, Pd_{10} is equal to the d_{10} particle size distribution measurement of the processed batch of porous ceramic particles and Pd_{50} is equal to a d_{50} particle size distribution measurement of the processed batch of porous ceramic particles,

wherein a ratio IPDS/PPDS for the forming of initial batch into the processed batch of porous ceramic particles is at least 0.90,

wherein the first batch spray fluidization forming cycle comprises repeatedly dispensing finely dispersed droplets of a first coating fluid onto air borne porous ceramic particles,

wherein the ceramic particles comprise a core region composition,

wherein the first coating fluid comprises a first coating material; and

wherein the first coating material composition is different than the core region composition;

wherein the first coating material composition is changed gradually for a portion of or throughout a duration of the first batch spray fluidization forming cycle by gradually changing the concentration of a material in the first coating material composition from a first concentration of the material at a beginning of the first batch spray fluidization forming cycle to a second concentration of the material at an end of the first batch spray fluidization forming cycle.

3. A method of forming a catalyst carrier, wherein the method comprises:

forming a porous ceramic particle using a spray fluidization forming process comprising a first batch spray fluidization forming cycle; and sintering the porous ceramic particle at a temperature of at least 350 ˚C not greater than 1400˚C,

wherein the porous ceramic particle comprises a particle size of at least 200 microns and not greater than 4000 microns,

wherein the first batch spray fluidization forming cycle comprises repeatedly dispensing finely dispersed droplets of a first coating fluid onto air borne porous ceramic particles,

wherein the ceramic particles comprise a core region composition,

wherein the first coating fluid comprises a first coating material composition; and

wherein the first coating material composition is different than the core region composition;

wherein the first coating material composition is changed gradually for a portion of or throughout a duration of the first batch spray fluidization forming cycle by gradually changing the concentration of a material in the first coating material composition from a first concentration of the material at a beginning of the first batch spray fluidization forming cycle to a second concentration of the material at an end of the first batch spray fluidization forming cycle.

4. A method of forming a plurality of porous ceramic particles, wherein the method comprises:

forming the plurality of porous ceramic particles using a spray fluidization forming process conducted in a batch mode and comprising at least a first batch spray fluidization forming cycle,

wherein the plurality of porous ceramic particle comprise a particle size of at least 200 microns and not greater than 4000 microns,

wherein the first batch spray fluidization forming cycle comprises repeatedly dispensing finely dispersed droplets of a first coating fluid onto air borne porous ceramic particles,

wherein the ceramic particles comprise a core region composition,

wherein the first coating fluid comprises a first coating material composition; and

wherein the first coating material composition is different than the core region composition;

wherein the first coating material composition is changed gradually for a portion of or throughout a duration of the first batch spray fluidization forming cycle by gradually changing the concentration of a material in the first coating material composition from a first concentration of the material at a beginning of the first batch spray fluidization forming cycle to a second concentration of the material at an end of the first batch spray fluidization forming cycle.

5. The plurality of porous ceramic particles or method of any one of claims 1, 2, 3 and 4, wherein the core region composition comprises alumina, zirconia, titania, silica or a combination thereof.

6. The plurality of porous ceramic particles or method of any one of claims 1, 2, 3 and 4, wherein the first coating material composition comprises alumina, zirconia, titania, silica or a combination thereof.

7. The plurality of porous ceramic particles or method of any one of claims , 2, 3 and 4, wherein the first coating material composition remains constant throughout the first batch spray fluidization forming cycle.

8. The plurality of porous ceramic particles or method of any one of claims 1, 2, 3 and 4, wherein the first concentration of the material is less than the second concentration of the material.

9. The plurality of porous ceramic particles or method of any one of claims 1, 2, 3 and 4, wherein the first concentration of the material is greater than the second concentration of the material.

10. The plurality of porous ceramic particles or method of any one of claims 1, 2, 3 and 4, wherein the spray fluidization forming process further comprises a second batch spray fluidization forming cycle,

wherein the second batch spray fluidization forming cycle comprises repeatedly dispensing finely dispersed droplets of a second coating fluid onto air borne ceramic particles formed during the first batch spray fluidization forming cycle to form the processed batch of porous ceramic particles,

wherein the second coating fluid comprises a second coating material composition; and

wherein the second coating material composition is different than the first coating material composition.

11. The plurality of porous ceramic particles or method of claim 10, wherein the second coating material composition comprises alumina, zirconia, titania, silica or a combination thereof.

12. The plurality of porous ceramic particles or method of claim 11, wherein the second coating material composition remains constant throughout the second batch spray fluidization forming cycle.

13. The plurality of porous ceramic particles or method of claim 11, wherein the second coating material composition is changed gradually for a portion of or throughout a duration of the second batch spray fluidization forming cycle by gradually changing the concentration of a material in the second coating material composition from a first concentration of the material at a beginning of the second batch spray fluidization forming cycle to a second concentration of the material at an end of the second batch spray fluidization forming cycle.

14. The plurality of porous ceramic particles or method of claim 13, wherein the first concentration of the material is less than the second concentration of the material.

15. The plurality of porous ceramic particles or method of claim 13, wherein the first concentration of the material is greater than the second concentration of the material.