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(54) Titre : PROCEDE DE PRODUCTION DE MATERIAU GRANULE STABLE A L'ATTRITION
(54) Title: PROCESS FOR PRODUCTION OF ATTRITION STABLE GRANULATED MATERIAL

(57) Abrégé/Abstract:
The present invention relates to granulated particles with improved attrition and a method for producing granulated particles by fluidized bed granulation of inorganic particles wherein particles of reduced particle size are fed into a fluldized-bed granulation reactor thereby producing granulated particles with improved attrition.

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(54) Title: PROCESS FOR PRODUCTION OF ATTRITION STABLE GRANULATED MATERIAL

(57) Abstract: The present invention relates to granulated particles with improved attrition and a method for producing granulated particles by fluidized bed granulation of inorganic particles wherein particles of reduced particle size are fed into a fluldized-bed granulation reactor thereby producing granulated particles with improved attrition.

Claims

1. A method of producing granulated particles in a fluidized-bed granulation reactor, the method comprising feeding inorganic particles dispersed in a dispersion medium into the fluidized-bed granulation reactor the inorganic particles in the dispersion medium having a D_{90} value of between 1 µm and 15 µm.

2. The method of claim 1 wherein the dispersion medium comprising inorganic particles dispersed therein is sprayed into a process chamber of the fluidized-bed granulation reactor while heated process gas flows through the process chamber from the bottom to the top, the heated gas preferably has an inlet temperature when entering the process chamber of 0°C to 550°C, more preferably 50°C to 550°C, most preferably 100°C to 400°C.

3. The method of claim 1 or 2, wherein the D_{90} value of the inorganic particles in the dispersion medium fed into the fluidized-bed granulation reactor is between 1 µm and 10 µm and preferably is between 1 µm and 5 µm.

4. The method of any one of claims 1 to 3, wherein the inorganic particles include compounds of alkaline earth metals, rare earth elements, platinum group elements, iron group elements, Cu, Ag, Au, Zn, Al, In, Sn, Si, P, V, Nb, Mo, W, Mn, Re, Ti, Zr or mixtures thereof, with the compounds preferably being oxides or oxide hydrates thereof or the mixtures thereof.

5. The method of any one of the preceding claims, wherein the inorganic particles are particles of alumina, silica, or a mixture thereof, preferably hydrated alumina, boehmite and/or bayerite and in particular boehmite.

6. The method of any one of the preceding claims, wherein the dispersion medium comprises water or consists of water.

7. The method of any one of the preceding claims, wherein a stabilizer is added to the dispersion medium, the stabilizer preferably being a polyvinyl alcohol or a carbohydrate.

8. The method of any one of the preceding claims, including the initial step of milling the inorganic particles in the dispersion medium to a D_{90} value between 1 µm and 15 µm, preferably between 1 µm and 10 µm and most preferably between 1 µm and 5 µm, before entering into the fluidized-bed granulation reactor.

9. The method of claim 7 or 8, wherein the stabilizer is added to the dispersion medium only after the milling step.

10. The method of any one of the preceding claims, wherein the dispersion medium includes between 5 and 60 wt.% inorganic particles relative to the total amount of the dispersion medium.

11. The method of any one of the preceding claims, wherein the dispersion medium has a pH of between 2 and 12.

12. The method of any one of the preceding claims, including a calcination step, wherein the calcination is conducted at a temperature of between 350°C and 1600°C for a period of 30 minutes to 5 hours.

13. The method of claim 1, wherein seed material comprising primary particles having a D_{50} value from 5 µm to 200 µm, preferably 50 µm to 80 µm, is either further included in the dispersion fed into the fluidized-bed granulation reactor and/or is already present in the fluidized-bed granulation reactor when the dispersion is fed into the fluidized-bed granulation reactor.

14. Spherical calcinated granulated particles produced according to the method of claims 1 to 12 having a D_{50} value of between 100 and 5000 µm, preferably between 400 and 1000 µm.

15. Spherical, calcined granulated particles having
a D_{50} value of the granulated particles between 100 and 5000 µm, preferably between 400 and 1000 µm, a volume based sphericity of the particles of the granulated material between 0.900 and 1.00 and an attrition value of less than 5%, preferably less than 2%, further characterized by more than one, or all, preferably all, of the following characteristics:

i) a loose bulk density between 0.3 and 2.5 g/cm^3, preferably between 0.5 and 2 g/cm^3, most preferably between 0.5 and 1 g/cm^3;

ii) a specific surface area ranging from 0.1 to 500 m^2/g, preferably 150 to 300 m^2/g and most preferably 150 to 250 m^2/g;

iii) a pore volume of 0.01 to 2.0 cm^3/g, preferably between 0.1 and 1 cm^3/g;

or

iv) a monomodal or multimodal pore size distribution with pore radii maxima between 25 and 100000 Å, preferably between 25 and 500 Å, most preferable between 25 and 100 Å.