CLAIMS

1. A graphene powder which is a stack of graphene sheets, wherein the graphene powder involves in its Raman spectrum a D peak and a G peak with peak heights of I_D and I_G respectively, where I_D/I_G is 0.03-0.10, wherein there are voids in the graphene powder between the graphene sheets, wherein the graphene powder has a particle size of 20-35 μm, and wherein the graphene powder has a specific surface area of 50-300m^2/g.

2. The graphene powder of claim 1, wherein based on mass of the graphene powder, the graphene powder has a carbon content of equal to or greater than 99.50%, preferably 99.80-99.95%, and an oxygen content of 300 ppm or below.

3. The graphene powder of claim 1, wherein the graphene powder has a specific surface area of 100-250 m^2/g; or

the graphene powder has a tap density of 0.02-0.04 g/cm^3; or

the graphene powder has a conductivity of 500-5000 S/cm, preferably 1500-4000 S/cm, and further preferably 2000-3500 S/cm.

4. The graphene powder of any one of claims 1-3, wherein the graphene sheets comprise 1-10 layers of graphene;

preferably, the graphene sheets have a median particle size of 5-15 μm, preferably 8-15μm.

5. The graphene powder of any one of claims 1-3, wherein the graphene sheets involve in their Raman spectrum a D peak and a G peak with peak heights of I_D and I_G respectively, where I_D/I_G is 0.03-0.10.

6. The graphene powder of any one of claims 1-3, wherein when subjected to a heat treatment under an air atmosphere, the graphene sheets have a starting temperature for thermal decomposition of greater than or equal to 600 ℃, and preferably greater than or equal to 700 ℃; or

when subjected to a heat treatment under an air atmosphere at 800 ℃, the graphene sheets have a thermal-loss rate of less than or equal to 10%, preferably less than or equal to 8%, more preferably less than or equal to 5%.

7. The graphene powder of any one of claims 1-3, wherein the graphene sheets have a conductivity of 500-5000 S/cm, preferably 1500-4000 S/cm, and further preferably 2000-3500 S/cm.

8. A method for preparing the graphene powder of any one of claims 1-7, comprising the steps of:

(1) subjecting an expandable graphite to pre-expanding, to obtain a pre-expanded graphite;

(2) mixing the pre-expanded graphite obtained in step (1), a wetting agent and a solvent, and then subjecting the mixture to a first high-pressure homogenization and a second high-pressure homogenization, to obtain a slurry containing the graphene powder, wherein the pressure of the second high-pressure homogenization is 10-20MPa higher than the pressure of the first high-pressure homogenization;

(3) drying the slurry containing the graphene powder obtained in step (2), to obtain the graphene powder,

wherein the wetting agent in step (2) is fatty amine polyoxyethylene ether; preferably, the fatty amine polyoxyethylene ether has a HLB value of greater than or equal to 12.

9. The method of claim 8, wherein, compared to the expandable graphite before the pre-expanding, the pre-expanded graphite obtained in step (1) has an expansion ratio of 200-300 times;

preferably, step (1) of pre-expanding includes the steps of: heating the expandable graphite to 800-950 ℃, subjecting to expanding for 10-60 seconds, to obtain the pre-expanded graphite.

10. The method of claim 8, wherein, in step (2), the first high-pressure homogenization is operated at a pressure of 30-40 MPa for 20-60 minutes, and the second high-pressure homogenization is operated at a pressure of 40-50 MPa for 10-30 minutes.

11. The method of claim 8, wherein the pre-expanded graphite obtained in step (1) and the wetting agent are fed in a mass ratio of 1:0.01-0.1 in step (2).

12. The method of claim 8, wherein the drying in step (3) is spray drying or freeze-drying, wherein the spray drying is operated under conditions of: an air inlet temperature being 300-350 ℃, the air inlet temperature being 200-250 ℃ higher than an air outlet temperature, the air outlet temperature being 100-130 ℃, and a rotating speed of the centrifugal disc of the spray drying equipment being 20000-30000 rpm; and wherein the freeze-drying is operated under conditions of: a cold trap temperature being not higher than -65 ℃, preferably -75 to -70 ℃; a temperature of the cubical separator being not higher than -55 ℃, preferably -65 to -60 ℃; a heating rate being 0.1-0.5 ℃/min; a time for heating from the temperature of the cubical separator to 0 ℃ being not less than 24 hours, preferably 26-30 hours; and a vacuum degree being not higher than 10 Pa, preferably 0.5-5 Pa.

13. A use of the graphene powder of any one of claims 1-7 or the graphene powder prepared by the method of any one of claims 8-12 in a conductive composite material, an anti-corrosion coating or a heat dissipation composite material.