for treatments to repeat the steps of collecting and concentrating the supernatant, and there is a problem of inferior production efficiency of a graphene dispersion. As disclosed in Patent Literature 2, even by subjecting natural graphite to an ultrasonic treatment for a long time, only weak parts of the surface are exfoliated, other large parts do not contribute to the exfoliation, and it is considered as a problem that the amount of exfoliated graphene is small.

{0007}

The invention was completed focusing on such problem points, and a graphite-based carbon material, from which graphene is easily exfoliated by carrying out predetermined treatments to natural graphite, and which makes it possible to disperse graphene at a high concentration or to a high degree is called a graphene precursor. ~~Then, an object~~Embodiments of the invention ~~is~~ seek to provide a graphite-based carbon material useful as such a graphene precursor, as well as a method of producing the same.

{Solution to Problem}

{0008}

An aspect of the present invention provides a graphene composite comprising at least a graphene is partially exfoliated from the graphite-based carbon material and dispersed in a base material,

the graphite-based carbon material having a rhombohedral graphite layer (3R) and a hexagonal graphite layer (2H), wherein a Rate (3R) of the rhombohedral graphite layer (3R) and the hexagonal graphite layer (2H), based on an X-ray diffraction method, which is defined by following Equation 1, is 31% or more:

$$\text{Rate (3R)} = P3/(P3+P4)\times 100 \cdots \text{(Equation 1)}$$

wherein

P3 is a peak intensity of a (101) plane of the rhombohedral graphite layer (3R) based on the X-ray diffraction method, and

P4 is a peak intensity of a (101) plane of the hexagonal graphite layer (2H) based on the X-ray diffraction method,

the graphene being a crystal of a mean size of 100nm or more and formed in a flake-like or sheet-like shape having 10 layers or less.

Another aspect of the present invention provides a method of producing a graphene composite, comprising a step of mixing at least a graphite-based carbon material in a base material, wherein graphene is partially exfoliated from the graphite-based carbon material and dispersed in the base material,

the graphite-based carbon material having a rhombohedral graphite layer (3R) and a hexagonal graphite layer (2H), wherein a Rate (3R) of the rhombohedral graphite layer (3R) and the

hexagonal graphite layer (2H), based on an X-ray diffraction method, which is defined by following Equation 1, is 31% or more:

$$\text{Rate (3R)} = P3/(P3+P4)\times 100 \cdots \text{(Equation 1)}$$

wherein

P3 is a peak intensity of a (101) plane of the rhombohedral graphite layer (3R) based on the X-ray diffraction method, and

P4 is a peak intensity of a (101) plane of the hexagonal graphite layer (2H) based on the X-ray diffraction method,

the graphene being a crystal of a mean size of 100nm or more and formed in a flake-like or sheet-like shape having 10 layers or less. ~~In order to solve the above-described problems,~~ There is also disclosed the graphite-based carbon material useful as a graphene precursor of the invention is characterized by having a rhombohedral graphite layer (3R) and a hexagonal graphite layer (2H), wherein

{CLAIMS}

{Claim 1}

A graphene composite comprising at least a graphene is partially exfoliated from the graphite-based carbon material and dispersed in a base material,

the graphite-based carbon material having a rhombohedral graphite layer~~(3R)~~ and a hexagonal graphite layer~~(2H)~~, wherein a Rate~~(3R)~~ of the rhombohedral graphite layer~~(3R)~~ and the hexagonal graphite layer~~(2H)~~, based on an X-ray diffraction method, which is defined by following Equation 1, is 31% or more:

$$Rate_{(3R)} = P3/(P3+P4)\times 100 \cdots\cdots \text{(Equation 1)}$$

wherein

P3 is a peak intensity of a (101) plane of the rhombohedral graphite layer~~(3R)~~ based on the X-ray diffraction method, and

P4 is a peak intensity of a (101) plane of the hexagonal graphite layer~~(2H)~~ based on the X-ray diffraction method,

the graphene being a crystal of a mean size of 100nm or more and formed in a flake-like or sheet-like shape having 10 layers or less.

{Claim 2}

The graphene composite according to claim 1, being used as a resin molded article.

{Claim 3}

The graphene composite according to claim 2, wherein the base material is a resin and a compatibilizer is dispersed in the base material.

{Claim 4}

The graphene composite according to claim 1, being used as conductive ink.

{Claim 5}

The graphene composite according to claim 4, the base material is at least one of a solvent and a conductivity-imparting agent.

{Claim 6}

A method of producing a graphene composite, comprising a step of mixing at least a graphite-based carbon material in a base material, wherein graphene is partially exfoliated from the graphite-based carbon material and dispersed in the base material,

the graphite-based carbon material having a rhombohedral graphite layer~~(3R)~~ and a hexagonal graphite layer~~(2H)~~, wherein a Rate~~(3R)~~ of the rhombohedral graphite layer~~(3R)~~ and the hexagonal graphite layer~~(2H)~~, based on an X-ray diffraction method, which is defined by following Equation 1, is 31% or more:

$$\text{Rate}_{(3R)} = P3/(P3+P4)\times 100 \cdots\cdots \text{(Equation 1)}$$

wherein

P3 is a peak intensity of a (101) plane of the rhombohedral graphite layer ~~(3R)~~ based on the X-ray diffraction method, and

P4 is a peak intensity of a (101) plane of the hexagonal graphite layer ~~(2H)~~ based on the X-ray diffraction method,

the graphene being a crystal of a mean size of 100nm or more and formed in a flake-like or sheet-like shape having 10 layers or less.

{Claim 7}

The method of producing a graphene composite according to claim 6, wherein:

the base material is a resin;

the mixing step involves kneading while applying sharing force; and

the graphene composite is a resin molded article.

{Claim 8}

The method of producing a graphene composite according to claim 7, wherein a compatibilizer is added and kneaded in the base material in the mixing step.

{Claim 9}

The method of producing a graphene composite according to claim 6, wherein the graphene composite is conductive ink.

{Claim 10}