CLAIMS

1. A neutron beam shielding gypsum-based building board comprising:

gypsum;

a boron-containing material containing boron an amount of which is in a range from 1.0 parts by mass to 120 parts by mass with respect to 100 parts by mass of the gypsum; and

a water reducing agent in a range from 0.05 parts by mass to 2.0 parts by mass with respect to 100 parts by mass of the gypsum,

wherein the boron-containing material includes one or more kinds selected from calcium borate, boron carbide, boric acid, boron oxide, sodium borate, and calcium boride,

wherein a specific gravity in a dry condition is in a range from 0.65 to 1.6,

wherein a thickness of the neutron beam shielding gypsum-based building board is greater than or equal to 9.5 mm and less than or equal to 25.0 mm, and

wherein a neutron beam shielding rate of the neutron beam shielding gypsum-based building board is greater than 60%.

2. The neutron beam shielding gypsum-based building board according to claim 1,

wherein the boron-containing material is colemanite, and

wherein the water reducing agent is one or more kinds selected from a naphthalene-based water reducing agent and a melamine-based water reducing

agent.

3. The neutron beam shielding gypsum-based building board according to claim 1,

wherein the boron-containing material is boron carbide, and

wherein the water reducing agent is one or more kinds selected from a naphthalene-based water reducing agent, a polycarboxylic acid-based water reducing agent, a lignin-based water reducing agent, and a melamine-based water reducing agent.

4. The neutron beam shielding gypsum-based building board according to any one of claims 1 to 3,

wherein a surface material is disposed on a first surface side and on a second surface side that is opposite to the first surface, and the surface material is one kind selected from a base sheet for a board, a glass fiber non-woven fabric, and a glass mat.

5. The neutron beam shielding gypsum-based building board according to any one of claims 1 to 4,

wherein the neutron beam shielding gypsum-based building board has a second grade exothermic property or higher.

6. A method of manufacturing a neutron beam shielding gypsum-based building board comprising:

a kneading step of kneading a raw material containing at least gypsum, a boron-containing material, a water reducing agent, and water to form a gypsum slurry;

a molding step of molding the gypsum

slurry; and

a step of curing the molded gypsum slurry obtained in the above-described molding step;

wherein, in the raw material, the amount of boron contained in the boron-containing material is in a range from 1.0 parts by mass to 120 parts by mass with respect to 100 parts by mass of dihydrate gypsum,

wherein, the raw material contains the water reducing agent in a range from 0.05 parts by mass to 2.0 parts by mass with respect to 100 parts by mass of dihydrate gypsum,

wherein the boron-containing material contains one or more kinds selected from calcium borate, boron carbide, boric acid, boron oxide, sodium borate, and calcium boride,

wherein a specific gravity in a dry condition of the neutron beam shielding gypsum-based building board obtained after the curing step is in a range from 0.65 to 1.6,

wherein a thickness of the neutron beam shielding gypsum-based building board is adapted to be greater than or equal to 9.5 mm and less than or equal to 25.0 mm, and

wherein a neutron beam shielding rate of the neutron beam shielding gypsum-based building board is greater than 60%.

7. The method of manufacturing a neutron beam shielding gypsum-based building board according to claim 6,

wherein the boron-containing material is colemanite, and

wherein the water reducing agent is one or

more kinds selected from a naphthalene-based water reducing agent and a melamine-based water reducing agent.

8. The method of manufacturing a neutron beam shielding gypsum-based building board according to claim 6,

wherein the boron-containing material is boron carbide, and

wherein the water reducing agent is one or more kinds selected from a naphthalene-based water reducing agent, a polycarboxylic acid-based water reducing agent, a lignin-based water reducing agent, and a melamine-based water reducing agent.

9. The method of manufacturing a neutron beam shielding gypsum-based building board according to any one of claims 6 to 8,

wherein the gypsum slurry is disposed between the surface materials in the molding step, and

wherein the surface material is one kind selected from a base sheet for a board, a fiberglass non-woven fabric, and a glass mat.

10. The method of manufacturing a neutron beam shielding gypsum-based building board according to any one of claims 6 to 9,

wherein the neutron beam shielding gypsum-based building board obtained after the curing step has a second grade exothermic property or higher.