

Description

Title of Invention

LED LIGHT SOURCE FOR PLANT CULTIVATION

5 Technical Field

[0001]

10 The present invention relates to a plant cultivation LED light source for emitting light to be absorbed by a plant which requires light in order to carry out photosynthesis for growth.

Background Art

[0002]

15 Conventionally known light-emitting devices provided with an LED (Light Emitting Diode) include, for example, light-emitting devices disclosed in Patent Literatures 1 through 5.

[0003]

20 Patent Literature 1 discloses a light-emitting device provided with LEDs, the light-emitting device including (i) a blue light-emitting element for emitting blue light and (ii) a phosphor layer (a) being coated on the blue light-emitting element and (b) including phosphors which emit

Claims

Claim 1

A plant cultivation LED light source, comprising:

a substrate;

at least one blue LED chip, provided on the substrate, for emitting blue light having a light emission peak at a wavelength in a range of 400 nm to 480 nm;

a red phosphor mixed resin which is provided so as to cover the blue LED chip and contains red phosphors being dispersed or settled down therein, each of the red phosphors emitting, in response to excitation light emitted from the blue LED chip, red light having a light emission peak at a wavelength in a range of 620 nm to 700 nm;

a silicone resin which is transparent, has a dome shape, and is provided so as to cover the red phosphor mixed resin; and

a plurality of LED packages provided on a mounting substrate, each of the plurality of LED packages including (i) the at least one blue LED chip provided on the substrate, (ii) the red phosphor mixed resin, and (iii) the silicone resin, the red phosphor mixed resin and the silicone resin being provided so as to cover the at least one blue LED chip.

Claim 2

The plant cultivation LED light source as set forth in claim 1, wherein as the plurality of LED packages, LED packages have different light amount ratios of blue region emission light to red region emission light are provided in combination.

Claim 3

The plant cultivation LED light source as set forth in claim 1, wherein the substrate is made of ceramic or a film-like base material.

Claim 4

The plant cultivation LED light source as set forth in claim 1, wherein each of the red phosphor mixed resin and the silicone resin has a dome shape.

Claim 5

The plant cultivation LED light source as set forth in claim 1, wherein (i) the plurality of LED packages, each of which includes the blue LED chip, the red phosphor mixed resin, and the silicone resin, the red phosphor mixed resin and the silicone resin being provided so as to cover the blue LED chip and (ii) a plurality of LED packages for illumination are provided on the mounting substrate.

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LED LIGHT SOURCE

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Background Art

[0002]

Conventionally known light-emitting devices provided with an LED (Light Emitting Diode) include, for example, light-emitting devices disclosed in Patent Literatures 1 through 5.

[0003]

Patent Literature 1 discloses a light-emitting device provided with LEDs, the light-emitting device including (i) a blue light-emitting element for emitting blue light and (ii) a phosphor layer (a) being coated on the blue light-emitting element and (b) including phosphors which emit

Claims

1. An LED light source, comprising:

a mounting substrate; and

a plurality of plant cultivation LED packages on the mounting substrate, each of the plurality of the plant cultivation LED packages including:

a substrate different from the mounting substrate;

at least one blue LED chip, provided on the substrate, for emitting blue light having a light emission peak at a wavelength in a range of 400 nm to 480 nm;

a red phosphor mixed resin which is provided so as to directly cover the blue LED chip and contains red phosphors being dispersed or settled down therein, each of the red phosphors emitting in response to excitation light emitted from the blue LED chip, red light having a light emission peak at a wavelength in a range of 620 nm to 700 nm; and

a silicone resin which is transparent, has a dome shape, and is provided so as to cover the red phosphor mixed resin.

2. The LED light source as set forth in claim 1, wherein as the plurality of plant cultivation LED packages, LED packages have different light amount ratios of blue region emission light to red emission light are provided in combination.

3. The LED light source as set forth in claim 1, wherein the substrate is made of ceramic or film-like base material.

4. The LED light source as set forth in claim 1, wherein the red phosphor mixed resin has a dome shape.

5. The LED light source as set forth in claim 1, further comprising illumination LED packages other than the plant cultivation LED packages provided on the mounting substrate.