CLAIMS

1. A humidity-controlling device using an adsorbent which adsorbs moisture in air, the humidity-controlling device comprising:

a control unit configured to control a temperature of the adsorbent or a relative humidity of air supplied to the adsorbent, wherein

when, in an adsorption isotherm of the adsorbent, a range less than a first relative humidity value is a first range, a range equal to or higher than the first relative humidity value and equal to or lower than a second relative humidity value (the second relative humidity value > the first relative humidity value) is a second range, and a range exceeding the second relative humidity value is a third range, a change in moisture content of the adsorbent to a change in relative humidity in the second range is larger than a change in moisture content of the adsorbent to a change in relative humidity in the first range and the third range, and

the control unit causes the adsorbent to desorb moisture in a vicinity of the first relative humidity value and causes the adsorbent to adsorb moisture in a vicinity of the second relative humidity value.

2. The humidity-controlling device of claim 1, wherein

a slope of the adsorption isotherm of the adsorbent in the second range is five times or more a slope of the adsorption isotherm of the adsorbent in the first range and the third range.

3. The humidity-controlling device of claim 1 or 2, wherein

a variation in moisture content of the adsorbent in the second range is 50% or more of a maximum moisture content of the adsorbent.

4. The humidity-controlling device of any one of claims 1 to 3, wherein

a difference between the second relative humidity value and the first relative humidity value is 40% or less.

5. The humidity-controlling device of any one of claims 1 to 4, wherein

the vicinity of the first relative humidity value is a range from –10% of the first relative humidity value to the first relative humidity value, and

the vicinity of the second relative humidity value is a range from the second relative humidity value to +10% of the second relative humidity value.

6. The humidity-controlling device of any one of claims 1 to 5, wherein

the adsorbent has a metal organic framework.

7. The humidity-controlling device of any one of claims 1 to 6, further comprising:

an adsorption desorption unit including the adsorbent and configured to adsorb moisture in target air and desorb the moisture adsorbed;

a heat source configured to control a relative humidity at which the adsorption desorption unit adsorbs and desorbs moisture;

a fan configured to control airflow of the target air; and

an acquisition unit configured to acquire temperature-humidity data of the target air, wherein

the control unit controls a temperature of the heat source based on the temperature-humidity data acquired by the acquisition unit.

8. The humidity-controlling device of claim 7, wherein

the adsorption isotherm of the adsorbent includes an adsorption line when moisture is adsorbed, and a desorption line when adsorbed moisture is desorbed,

the adsorption desorption unit includes: an adsorption unit configured to adsorb moisture in the target air; and a desorption unit configured to desorb moisture adsorbed,

the heat source includes a first heat source configured to control a relative humidity at which the adsorption unit adsorbs moisture; and a second heat source configured to control a relative humidity at which the desorption unit desorbs moisture,

the control unit controls a temperature of the second heat source such that moisture is desorbed from the desorption unit in the vicinity of the first relative humidity value in the desorption line, and controls a temperature of the first heat source such that the adsorption unit adsorbs moisture in the vicinity of the second relative humidity value in the adsorption line.

9. The humidity-controlling device of claim 8, wherein

when a room is dehumidified, based on temperature-humidity data of first target air supplied into the room from outside and a second target air exhausted out of the room from inside, the control unit performs control to lower a temperature of the first heat source such that a relative humidity of the first target air reaching the adsorption unit has a value in the vicinity of the second relative humidity value in the adsorption line, and to increase a temperature of the second heat source such that a relative humidity of the second target air reaching the desorption unit has a value in the vicinity of the first relative humidity value in the desorption line, thereby supplying the first target air into the room as dehumidified air and making the second target air into high-humidity air to be exhausted out of the room.

10. The humidity-controlling device of claim 8, wherein

when a room is humidified, based on temperature-humidity data of first target air exhausted out of the room from inside and second target air supplied into the room from outside, the control unit increases a temperature of the second heat source such that a relative humidity of the second target air reaching the desorption unit has a value in the vicinity of the first relative humidity value in the desorption line, and lowers a temperature of the first heat source such that a relative humidity of the first target air reaching the adsorption unit has a value in the vicinity of the second relative humidity value in the adsorption line, thereby supplying the second target air into the room as humidified air and making the first target air into low-humidity air to be exhausted out of the room.

11. The humidity-controlling device of any one of claims 8 to 10, wherein

the first heat source and the second heat source constitute a heat pump, and

the control unit controls a temperature of the first heat source and a temperature of the second heat source in a coordinated manner.

12. The humidity-controlling device of any one of claims 8 to 10, wherein

the first heat source and the second heat source do not constitute a heat pump, and

the control unit independently controls a temperature of the first heat source and a temperature of the second heat source.