CLAIMS

1. A substrate heat-treating apparatus comprising:

a process chamber in which a flat substrate to be heat treated is placed, the process chamber comprising a beam transmitting plate placed below the flat substrate and an infrared transmitting plate placed above the flat substrate;

a beam irradiating module for irradiating a VCSEL beam having a single wavelength to a lower surface of the flat substrate through the beam transmitting plate; and

an emissivity measuring module placed below the beam irradiating module and configured to measure the VCSEL beam reflected from the lower surface of the flat substrate, thereby measuring the emissivity of the flat substrate.

2. The substrate heat-treating apparatus of claim 1, wherein the process chamber comprises;

a side wall in which the flat substrate is seated,

an outer housing in which the infrared transmitting plate and an upper plate are placed above the flat substrate in the side wall, and

an inner housing placed below the flat substrate inside the outer housing and having an upper portion on which the beam transmitting plate is placed,

wherein the beam irradiating module is placed below the beam transmitting plate inside the inner housing.

3. The substrate heat-treating apparatus of claim 2, wherein the beam irradiating module comprises an emissivity measuring hole penetrating from an upper surface to a lower surface thereof, and the emissivity measuring module is placed below the

emissivity measuring hole.

4. The substrate heat-treating apparatus of claim 3, wherein the emissivity measuring module comprises a power-meter placed below the emissivity measuring hole and configured to receive the laser beam, thereby measuring the emissivity.

5. The substrate heat-treating apparatus of claim 3, wherein the emissivity measuring module comprises an optical cable placed below the emissivity measuring hole to receive the laser beam, and a power-meter connected to the optical cable to measure the emissivity.

6. The substrate heat-treating apparatus of claim 1, wherein the beam irradiating module comprises a laser light-emitting device, and the laser light-emitting device comprises a surface light-emitting laser device or an edge light-emitting laser device.

7. The substrate heat-treating apparatus of claim 1, wherein the beam irradiating module comprises a laser light-emitting device, and the laser light-emitting device comprises a VCSEL device.

8. The substrate heat-treating apparatus of claim 1, wherein the process chamber further comprises a substrate support configured to support an outer side of the flat substrate, and the substrate heat-treating apparatus further comprises a substrate rotating module configured to support and rotate the substrate support.

9. The substrate heat-treating apparatus of claim 1, wherein the substrate rotating module comprises;

an inner rotating means having a ring shape in which N poles and S poles are alternately formed in a circumferential direction and being coupled to a lower portion of the substrate support within the chamber lower space, and

an outer rotating means placed outside the outer housing to face the inner rotating means and configured to generate a magnetic force to rotate the inner rotating means.

10. The substrate heat-treating apparatus of claim 1, further comprising a further beam irradiating module configured to irradiate a further VCSEL beam to an upper surface of the flat substrate; and

a further emissivity measuring module placed above the further beam irradiating module and configured to measure the further VCSEL beam reflected from the upper surface of the flat substrate.