

## 【ABSTRACT】

The present invention relates to a method including heating a flat substrate with a VCSEL device and forming a multi-layered thin film (in which a first thin film and a second thin film are alternately deposited) on a top surface of the flat substrate through an epitaxy process, the present invention discloses the manufacturing method for the semiconductor device comprising a first thin film deposition step of supplying a first source gas at a first deposition temperature to deposit the first thin film to the top surface of the flat substrate, a deposition temperature-lowering step of lowering a temperature of the flat substrate from the first deposition temperature to a second deposition temperature, a second thin film deposition step of supplying a second source gas at the second deposition temperature to deposit the second thin film to a top surface of the first thin film, and a deposition temperature-rising step of rising the temperature of the flat substrate from the second deposition temperature to the first deposition temperature, and discloses a semiconductor device manufacturing apparatus for the above method.