APPLICATION

Photoluminescence

Photoluminescence (PL) is a process which a substance absorbs light and then re-radiates light. If a semiconductor is irradiated with a light which has energy greater than the band gap, an electron in semiconductor is excited and a pair of electron and electron hole is formed. Then more pairs are formed than when thermal equilibrium state. After that the energy of excited electron is emitted as a light when the pair recombinants. And this phenomenon is called photoluminescence. (See fig.1)
This emitted light is easy to be affected by impurities and defects of substance. Therefore it can get information of impurities and defects of substance by analyzing the details of light spectrum. Furthermore photoluminescence method has an advantage to measure samples non-invasively, without any pretreatments or electrode attachments.
325nm laser light of He-Cd laser and UV fiber laser is available to measure lattice defects in GaN semiconductor crystal which are used for LED or blue LED.
There are two measuring methods in photoluminescence: one is mapping measurement which measures the distribution of the power of emitted light from the sample, and the other is spectrum measurement which measures the relation of power and wavelength.
Equipment of photoluminescence which measure crystal of light-emitting devices, LED or blue LED, find out the existence or measure the distribution of defects and impurities, and determine a pass/fail.

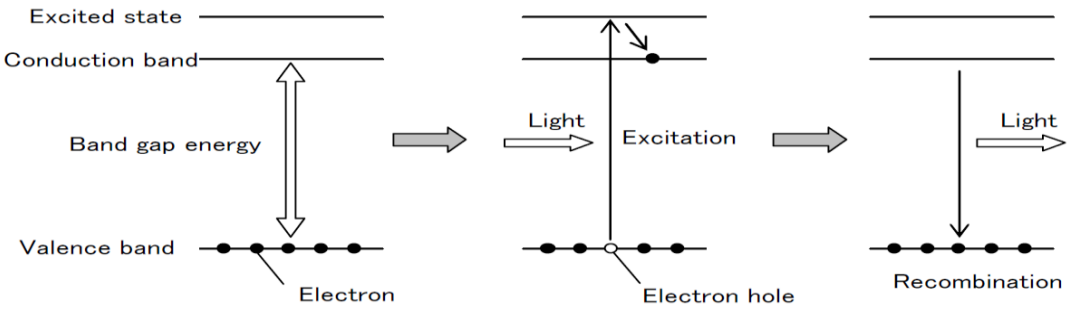

Fig.1 Photoluminescence in semiconductor

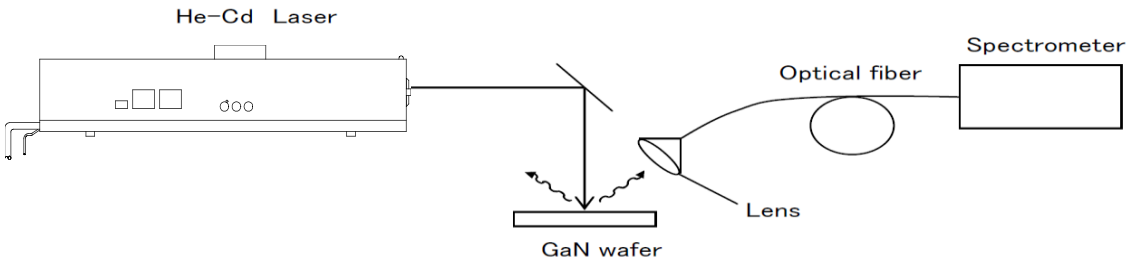

Fig.2 System outline of PL equipment