

## Photoluminescence characteristics of SiN<sub>x</sub> thin film deposited by PECVD at low temperature

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The use of plastic will enable a new product concept such as curved flexible displays. The advantages of plastic substrates compare to glass are greater flexibility and reduced sensitivity to flaws and defects. It is well known that silicon nitride is a wide-band-gap semiconductor that emits photoluminescence (PL). SiN<sub>x</sub> thin film is expected to be a good candidate as a optoelectric device.

In this experiment, silicon nitride(SiN<sub>x</sub>) thin film was deposited by PECVD(plasma enhanced chemical vapor deposition) at 200°C. The reactant gases were nitrogen(N<sub>2</sub>) and argon diluted 5% silane(SiH<sub>4</sub>). The plasma power, working pressure and deposition time were 20W, 500mTorr, and 30 minutes, respectively. The photoluminescence characteristics were measured at room temperature with a 325nm He-Cd laser as an excitation source.

The difference is the reactant gas flow rate between each sample. It results variation of PL from 727 nm to 517 nm. The emission wavelength is shifted by changing the SiN<sub>x</sub> thin film composition. It means the size of the silicon nano-dot embeded in SiN<sub>x</sub> is controled.