

유연기판위에 상분리를 이용한 반도체 나노입자 증착

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Deposition of Nanocrystals using Phase Separation on Flexible Substrates

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Abstract : We have fabricated semiconductor nanocrystals using phase separation on flexible substrates for future application in QD-LEDs. The phase separation between the CdSe semiconductor nanocrystals and TPD organic underlayer can occur during the solvent drying, and the CdSe may rise towards the surface of the coated films, which is arranged into close packed array called self-assembly process. In this work, the polyethylene naphthalate (PEN) films of 200 μ m thickness was used as a flexible substrate, which was coated with indium tin oxide(ITO) as a transparent electrode of $<15\Omega/\text{cm}^2$. A number of solvents such as chloroform, toluene, and hexane was used and their coating properties were investigated using the spin coating process. The dispersion of both QD and TPD was rather poor in toluene and hexane and resulted in rougher surface and some aggregates. Meanwhile, the surface roughness of templates can be a very critical issue in the fabrication of QD-LED devices. Some experiments was performed to reduce the $\sim 4\text{nm}$ surface roughness of the PEN films and It can be decreased to the minimum of $\sim 0.7\text{nm}$. Also discussed are the optical properties of semiconductor nanocrystals used in this phase separation and possible large area and continuous coating process for future application.

Key Words : QD-LEDs, phase separation, CdSe, TPD, self-assembly

Acknowledgements

This work was supported by a grant from the Basic Project of the Korea Institute of Materials Science