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Effect of thiophenol-based ligands on photoluminescence of quantum dot nanocrystals

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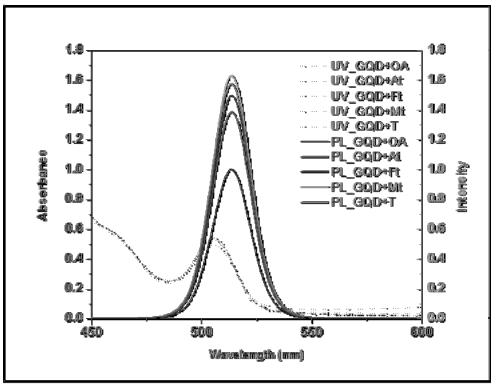
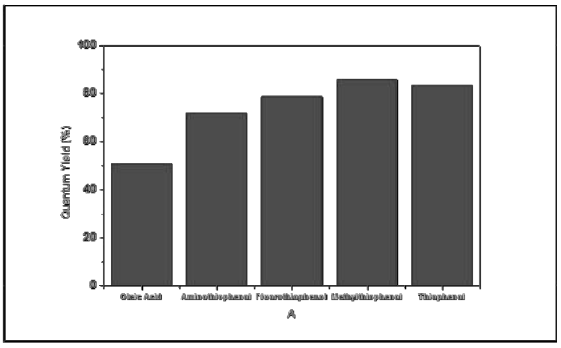
Quantum dot nanocrystals(QDs) have been emerged as next generation materials in the field of energy harvesting, sensor, and light emitting because of their compatibility with solution process and controllable energy band gap. Especially, characteristics of color tuning and color purity make it possible for QDs to be used photoluminescence materials. Photoluminescence devices with QDs have been researched for a long time. Photoluminescence quantum yield(PL QY) is important factor that defines the performance of Photoluminescence devices. One of the ways to achieve better PL QY is ligand modification. If ligands are changed to proper electron donating group, electrons can be confined in the core which results in enhancement of PL QY. Because of the reason, short ligands are preferred for enhancing PL QY. Thiophenol-based ligands are shorter than typical alkyl chain ligands. In this study, the effect of thiophenol-based ligands with different functional groups are investigated. Four different types of thiophenol-based organic materials are used as organic capping ligand. QDs with bare thiophenol and fluorothiophenol show better quantum yield compared to oleic acid.

Keywords: Photoluminescence, Quantum Dot Nanocrystals



‖Figure1.‖ UV PL of quantum dots



[Figure2.] Quantum Yield of Synthesized QDs