NW-P001

Adsorption Kinetic Studies of 5-fluorouracil Molecules on Hydroxyapatite Surface

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Hydroxyapatite (Ca10(PO4)6(OH)2) is known as the main inorganic component of mature mammalian bones and teeth. Because of its biocompatibility, hydroxyapatite has attracted much attention due to its potential applications in many biomedical researches. Here, we tested a therapeutic potential for the use of hydroxyapatite as an anticancer drug delivery vector. We prepared various types of hydroxyapatite having different chemical contents and morphologies using hydrothermal synthesis. The capability of hydroxyapatite as drug delivery materials was examined by adsorption kinetics of 5-fluorouracil molecules, a common anticancer drug, in phosphate buffered saline. We find that hydroxyapatite with smaller crystal size and higher phosphate contents shows improved adsorption property. Given that hydroxyapatite provides a scaffold for bone regeneration, these results highlight a potential use of hydroxyapatite in therapies aimed at osteosarcoma.

Keywords: Hydroxyapatite, 5-fluorouracil

NW-P002

Carrier Transport of Quantum Dot LED with Low-Work Function PEIE Polymer

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Recently, colloidal core/shell type quantum dots lighting-emitting diodes (QDLEDs) have been extensively studied and developed for the future of optoelectronic applications. In the work, we fabricate an inverted CdSe/ZnS quantum dot (QD) based light- emitting diodes (QDLED)[1]. In order to reduce work function of indium tin oxide (ITO) electrode for inverted structure, a very thin (< 10 nm) polyethylenimine ethoxylated (PEIE) is used as surface modifier[2] instead of conventional metal oxide electron injection layer. The PEIE layer substantially reduces the work function of ITO electrodes which is estimated to be 3.08 eV by ultraviolet photoemission spectroscopy (UPS). From transmission electron microscopy (TEM) study, CdSe/ZnS QDs are uniformly distributed and formed by a monolayer on PEIE layer. In this inverted QD LED, two kinds of hybrid organic materials, [poly (9,9-di-n-octyl-fluorene-alt-benzothiadiazolo)(F8BT) + poly(N,N'-bis (4-butylphenyl)-N,N'-bis(phenyl)benzidine (poly-TPD)] and [4,4'-N,N'-dicarbazole-biphenyl (CBP) + poly-TPD], were adopted as hole transport layer having high highest occupied molecular orbital (HOMO) level for improving hole transport ability. At a low-operating voltage of 8 V, the device emits orange and red spectral radiation with high brightness up to 2450 and 1420 cd/m2, and luminance efficacy of 1.4 cd/A and 0.89 cd/A, respectively, at 7 V applied bias. Also, the carrier transport mechanisms for the QD LEDs are described by using several models to fit the experimental I-V data.

Acknowledgement
This work is supported by KIST Institution Program (2Z04260)

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Keywords: Quantum Dot, LED, Carrier transport, Polymer, Inverted