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Multi-Color Emission of Hybrid Block Copolymer-Quantum Dot Microspheres by Controlled Quantum Dot Spatial Isolation KANG HEE KU, MINSOO KIM, KWANYEOL PAEK, JAE MAN SHIN, SUNHAENG CHUNG, KAIST, SE GYU JANG, KEPRI, WEON-SIK CHAE, KBSI, GI-RA YI, Sungkyunkwan University, BUMJOON KIM, KAIST, SE GYU JANG COLLABORATION, WEON-SIK CHAE COLLABORATION, GI-RA YI COLLABORATION
— Fluorescent quantum dots (QDs) are promising candidates for multi-color or white light-emitting systems, however, most current systems involve undesired Forster resonance energy transfer (FRET) between QDs. Herein, we developed multi-color emitting hybrid microspheres with block copolymers (BCPs) and QDs through control of the locations of different-colored QDs in BCP micelles. Hydrogen interaction assisted method was exploited to confine QDs within the BCP spheres without sacrificing any quantum yield efficiency. BCP microspheres with raspberry-like surface structures were prepared by an evaporation-induced self-assembly from an emulsion. When different-colored QDs were independently incorporated into isolated micelles, FRET was completely suppressed because the size of the protective micellar corona was greater than the Forster radius. In contrast, FRET was observed when QDs were concurrently incorporated into the same micelle cores. This spatial control of QDs in microsphere was confirmed by TEM, EDX, PL, and FLIM measurements. Through the isolated BCP micelles, ratiometric control of different colored QDs can display a wide range of colors

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