

High Temperature Synthesis of Bright InP/ZnSe/ZnS Quantum Dots for Display Applications

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InP-based quantum dots (QDs) have become alternative materials to heavy-metal-containing QDs and persistent effort has focused on the synthesis of InP-based QDs for better optical properties. However, InP-based QDs still show poorer optical and morphological properties than cadmium-based QDs as CdSe QDs. Here, we report the high temperature synthesis of Zn-chalcogenide shell on InP core. High temperature synthesis of Zn-chalcogenide shell on InP core can derive diffusion-controlled reaction for spherical morphology of the QDs by shell growth on the random facet. Spherical morphology means unidirectional carrier localization in core of the QDs, then increase of PL QY and external quantum efficiency in light-emitting device. In this work, red InP/ZnSe/ZnS core-multishell QDs exhibit 82% of the maximum PL quantum yield and excellent spherical morphology.