Synthesis of green-emitting dot-in-rod for electric-induced PL quenching in light-emitting device

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To realize QD-LED in display as well as lighting device, it is necessary to switch on-off of luminescence by electricity. Especially, both excitation and emission light in liquid crystal display have to be filtered by polarizer because the liquid crystal molecules convert white back light to emission light with desired color. However, dot-in-rod structure can be great substitute for emission material without polarizer because they can emit intrinsic polarized light and also their luminescence with narrow-width wavelength can be easily quenched by electricity. Nonetheless, green- or blue-emitting rod has not developed enough for commercial use because of lack of rod (shell) material covering large bandgap of quantum dot material. Here, we suggest a novel method fabricating green-emitting quantum rod with wurtzite shell material. A key factor in on-off ratio is aspect ratio of rod and composition of shell material.