**High resolution color conversion layer based on colloidal quantum dots**

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In recent years, the advances of the Internet of Things (IoTs) have brought tremendous changes in our daily life. Hugh information exchange requires a good machine-human interface, which could be an advanced display with IoT capabilities. This new demand drives the research of the new generation of display in the past few years. One of the leading technologies is the micro-LED based array with a color conversion layer to achieve a full-color micro-display. To achieve high definition, high frame rate, and great color quality, this micro-LED with a color conversion layer needs to possess high quantum yield and small pixel sizes in order to surpass its competing technologies. However, most of the color conversion material are difficult to be patterned and thus a large scale array with high resolution seems to be impossible. In this talk, we will reveal our latest progress in this field by using colloidal quantum dots as the color conversion material and demonstrate our method which uses mature semiconductor fabrication steps to enhance the accuracy and precision of the patterning procedures. On the other hand, a highly-efficient InGaN-based micro LED array is also necessary to be used as a pumping source. The passivation of the sidewall of the micro LED is particularly important to preserve the micro LED's quantum efficiency, especially when its size is smaller than 5 microns. An atomic layer deposition technique is usually applied in this situation to facilitate the passivation and the comparison of the device performance can reveal the great potential of the GaN based material in the small sized micro LED devices. Finally, the future perspective of this combination (micro LEDs + a color conversion layer) will be provided.