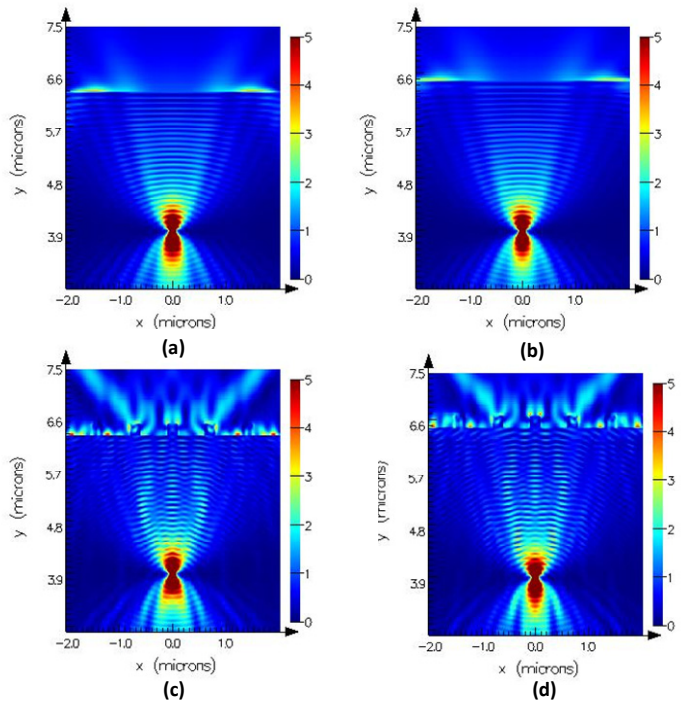

Fig. 6. 2D light intensity pattern from numerical FDTD simulation in case of (a) C-LED, (b) C-LED with ZnO wetting layer, (c) C-LED with ZnO nanorod array and (d) C-LED with ZnO nanorod array on top of ZnO wetting layer.

4. Conclusion

In summary, large-scale ordered ZnO nanorods have been integrated on the GaN LED by a simple, cost-effective and efficient nanoimprinting method. The introduction of the imprinted ZnO nanorods does not degrade the electrical properties of the final LEDs thanks to the room-temperature processing, unlike the previous reports. As a result of light scattering effect combined with the enhancement of light extraction through the ZnO nanorod sidewalls, the LEE of the integrated ZnO-nanorod/GaN LED is remarkably improved. In comparison with the conventional LED, a 100% improvement in the light emission efficiency has been observed. This integration method holds great promise for improving the light extraction of LEDs to achieve the high-power LEDs.

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