

Effect of quantum confinement and influence of extra charge on the electric field gradient in ZnO

Kutin Y., Mamin G., Orlinskii S., Bundakova A., Baranov P.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

By means of electron-nuclear double resonance (ENDOR), it is shown that the Al impurity, which acts as a shallow donor in ZnO, leads to a significant reduction of the electric field gradient in ZnO single crystals. In ZnO quantum dots, however, the gradient on the Al sites remains virtually unchanged. When the Zn $2+$ ion is substituted by Mn $2+$ in a ZnO single crystal, the electric field gradient slightly increases (by about 20%). Therefore, the Mn $2+$ ions can be used as probes to monitor the electric field gradients in ZnO crystals. © 2012 Pleiades Publishing, Ltd.

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