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**Effects of annealing of MgO buffer layer on structural quality**  
**of ZnO layers grown by P-MBE on c-sapphire**

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**Abstract**

We have investigated effects of annealing of MgO buffer layer on structural quality of ZnO layers grown by plasma assisted molecular beam epitaxy on c-sapphire. ZnO layers were characterized by atomic force microscopy, highresolution X-raydiffraction (HRXRD) and cross sectional transmission electron microscopy(TEM). AFM images show that annealing of a low temperature (LT)-MgO buffer at high temperatures enhanced the surface migration of adatoms, leading to the formation of larger terraces and smoother surface morphology, as indicated by the reduction of rms values of roughness from 0.6 to 0.3 nm. HRXRD and TEM experiments reveal that the dislocation densityof ZnO layers is reduced from  $5.3 \times 10^9$  to  $1.9 \times 10^9$   $\text{cm}^{-2}$  byannealing a LT-MgO buffer. All of those features indicate the structural quality of ZnO layers was improved by annealing a LT-MgO buffer layer.

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**Note:**

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