

[SY-G6]Symposium G-6

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[SY-G6]MD simulation study of displacement damage in bulk wurtzite GaN by proton irradiation

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Gallium nitride (GaN) based optoelectronic devices including LED and HEMT (High Electron Mobility Transistor) are widely used in aerospace industry because of large, direct band gap, high breakdown voltage and high electron mobility. Those applications loaded in satellites will be damaged during operating on the low earth orbit by radiation, which is mostly consisted of protons. Previous experimental research showed the decrements of the electron mobility and LED light intensity according to the proton fluence [1, 2]. However, it is difficult to show which kind of point defects are created and affected to the device. In this study, authors conduct Primary Knock-on Atom simulations in order to predict displacement damage on bulk wurtzite GaN by proton irradiation. PKA energy used in the MD simulation are obtained from GEANT4 simulation and experimental results. And author will show favorable type of point defects induced by displacement damage.

Reference

1. Xinwen, H., et al., *Proton-irradiation effects on AlGaIn/AlIn/GaN high electron mobility transistors*. IEEE Transactions on Nuclear Science, 2003. **50**(6): p. 1791-1796.
2. Khanna, S.M., et al., *Proton energy dependence of the light output in gallium nitride light-emitting diodes*. IEEE Transactions on Nuclear Science, 2004. **51**(5): p. 2729-2735.

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