

Effects of proton irradiation on SnO₂-based thin-film transistors

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Thin-film transistors (TFTs) are promising candidates for industrial and medical displays as well as in automotive and aerospace applications because they are cost-effective, low power consumption, high resolution and long lifespan [1]. In order to use it for space application, space radiation effects in TFTs must be evaluated. Therefore, there are many studies about radiation effects in TFTs based on IZO, ZnO, etc. [2-4]. SnO₂-based TFT is attractive due to superior intrinsic electrical properties [5]. However, there was hardly research considering the radiation effects on SnO₂-based TFT. In this study, we investigated the proton irradiation on the performance of SnO₂-based TFT. The irradiated proton energy and fluence were 5 MeV and 10¹¹ ~ 10¹² cm⁻², respectively. The threshold voltage of fabricated device was shift negatively by increasing proton fluences. We will analyze it to figure out the mechanism of this phenomenon.

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- [1] Jenifer, K., et al., J. Electron. Mater. 49, 7098–7111 (2020)
- [2] A. Indluru, et al., Thin Solid Films, 539, 342-344 (2013)
- [3] R. Rasmidi, et al., Radiat. Phys. Chem. 184, 109455 (2021)
- [4] D.-K. Kim, et al., Solid State Electronics, 215, 108884 (2024)
- [5] C. Park, et al., Mater. Today. Commun., 37, 107064 (2023)

Paper submission Plan

Yes

Best Presentation

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