

技术及应用

工艺条件对双极晶体管低剂量率辐射损伤增强效应的影响

陆妩^{1, 2}; 郑玉展^{1, 2, 3}; 任迪远^{1, 2}; 郭旗^{1, 2}; 余学峰^{1, 2}

1.中国科学院 新疆理化技术研究所, 新疆 乌鲁木齐830011 2.新疆电子信息材料与器件重点实验室, 新疆 3 中国科学院 研究生院, 北京100049

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摘要 对具有相同制作工艺但NPN管的发射极面积不同以及LPNP管发射极掺杂浓度相异的两种不同类型的国产双极晶体管, 在不同剂量率下进行辐射效应和退火特性研究。结果表明: 晶体管类型不同, 对高低剂量率的辐照响应也相异; 不同发射极面积的NPN管的结果显示, 发射极面积越小, 损伤越大; 不同掺杂浓度的LPNP管的结果则表明, 轻掺杂的发射极比重掺杂的具有更高的辐射敏感性。对各种实验现象的损伤机理进行了较详细的分析。

关键词 [双极晶体管](#) [⁶⁰Co \$\gamma\$ 辐照](#) [剂量率效应](#) [发射极面积](#) [掺杂浓度](#)

分类号

Impact of Process Technologies on ELDRS of Bipolar Transistors

LU Wu^{1, 2}; ZHENG Yu-zhan^{1, 2, 3}; REN Di -yuan^{1, 2}; GUO Qi^{1, 2}; YU Xue-feng^{1, 2}

1.Xinjiang Technical Institute of Physics & Chemistry, Chinese Academy of Sciences, Urumqi 830011, China; 2.Xinjiang Key Laboratory of Electronic Information Material and Device, Urumqi 830011, China; 3. Graduate University of Chinese Academy of Sciences, Beijing 100049, China

Abstract Radiation effects under different dose rates and annealing behaviors of domestic bipolar transistors, with same manufacture technology, were investigated. These transistors include NPN transistors of various emitter area, and LPNP transistors with different doping concentrations in emitter. It is shown that different types of transistors have different radiation responses. The results of NPN transistors show that more degradation occurs at less emitter area. Yet, the results of LPNP transistors demonstrate that transistors with lightly doped emitter are more sensitive to radiation, compared with heavily doped emitter. Finally, the mechanisms of the difference between various radiation responses were analyzed.

Key words [bipolar transistors](#) [⁶⁰Co \$\gamma\$ irradiation](#) [dose-rate effect](#) [emitter area](#) [doping concentration](#)

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