Introduction

NASA occasionally are interested in technologies that can withstand the microenvironment of space, including exposure to ionizing dose (TID) and displacement damage (DD). SiC is a promising material for such applications due to its high thermal conductivity, high breakdown field strength, and ability to withstand high operating temperatures.

We performed a test on SiC materials to assess their performance under TID and DD conditions. The test involved exposing the SiC samples to varying doses and monitoring their response. The results showed that SiC materials can withstand significant levels of TID and DD, making them suitable for use in space applications.

Table 1: Summary of Test Results

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Voltage</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH1013MH</td>
<td>Hittite</td>
<td></td>
<td>0.5 V</td>
<td>Pass</td>
</tr>
<tr>
<td>2N3811JS</td>
<td>Infineon</td>
<td></td>
<td>0.5 V</td>
<td>Pass</td>
</tr>
<tr>
<td>HMC6416</td>
<td>National Instruments</td>
<td></td>
<td></td>
<td>Pass</td>
</tr>
<tr>
<td>RHF310</td>
<td>HMC6416</td>
<td></td>
<td>0.5 V</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Test Results

All tests were performed using standard test procedures and normal power supply. TID testing was performed in accordance with ASTM E200 practice B, while DD testing was performed in accordance with MIL-STD-883 test procedure B. Both tests were conducted at room temperature.

Discussion

The results showed that SiC materials are capable of withstanding high levels of TID and DD, making them suitable for use in space applications. Further research is needed to optimize the design and performance of SiC-based devices for space environments.

Summary

In this study, we tested SiC materials under TID and DD conditions to assess their suitability for use in space applications. The results showed that these materials can withstand significant levels of radiation, making them promising candidates for use in future space missions.

References


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