Breakthrough time and mechanical properties of edge sealing in different environmental conditions

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Background and Objectives

Long term stability, reliability and operational lifetime of PV modules are essential for their commercial success. Since environmental conditions strongly affect both performance and yield of modules based on thin film technologies like CdTe, CIGS and a-Si, proper encapsulation architecture is important to obtain the desired long term outdoor stability. SAES Getters has focused its efforts on eliminating or minimizing moisture ingress along the edges of the module which is believed to be the main cause of degradation.

B-Dry®

Thin film photovoltaic panels with B-Dry edge sealant passed complete IEC 61646 and IEC 61730

B-Dry edge sealant as an Active Barrier

Damp Heat stability at 85°C 85%RH on CIGS, performed at ZSW


Features and Results

B-Dry edge sealant

Electrical Isolation

Dielectric Strength (kV/mm) 35
Volume Resistivity (ohm·cm) 10^18

Viscoelastic Properties

Elaboration of DMA analysis: characteristic relaxation time

Adhesion Strength to Glass: dependence on the deformation rate

<table>
<thead>
<tr>
<th>Condition</th>
<th>Lap shear (MPa)(50mm/min)</th>
<th>Lap shear (MPa)(1.1mm/min)</th>
<th>Ageing</th>
</tr>
</thead>
<tbody>
<tr>
<td>as received</td>
<td>0.44 ± 0.04</td>
<td>0.26 ± 0.006</td>
<td></td>
</tr>
<tr>
<td>after DH test 1000 hours @85°C 85%RH</td>
<td>0.41 ± 0.06</td>
<td>0.34 ± 0.025</td>
<td>IEC 61646</td>
</tr>
<tr>
<td>after DH test 2000 hours @85°C 85%RH</td>
<td>0.54 ± 0.09</td>
<td>IEC 61646</td>
<td></td>
</tr>
<tr>
<td>After UV aging</td>
<td>0.46 ± 0.03</td>
<td>XENOTEST MIAMI (30 days)</td>
<td></td>
</tr>
<tr>
<td>UV/50/HF</td>
<td>0.28 ± 0.012</td>
<td>IEC 61646</td>
<td></td>
</tr>
<tr>
<td>T/200</td>
<td>0.26 ± 0.096</td>
<td>IEC 61646</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions

- B-Dry shows a superior moisture barrier property
- B-Dry ensures very good damp heat stability
- B-Dry ensures lifetime even in hard weather conditions
- B-Dry ensures high electrical isolation

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