Interpenetrating polymer networks based on commercial silicone elastomers and ionic networks with high dielectric permittivity and self-healing properties

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Publication date: 2016

Document Version
Peer reviewed version

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Citation (APA):
Interpenetrating polymer networks based on commercial silicone elastomers and ionic networks with high dielectric permittivity and self-healing properties

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Interpenetrating polymer networks based on commercial silicone elastomers and ionic networks with high dielectric permittivity and self-healing properties

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Ionically assembled silicone polymers:
- Softening effect
- Very high dielectric permittivity
- Self-healing properties

Covalently cross-linked silicones:
- Mechanical integrity
- High breakdown strength

Goal: DRIVING VOLTAGE
Actuation Performance = \(\frac{\varepsilon'}{Y}\)
2.2.5 Interpenetrating polymer networks based on commercial silicone elastomers and ionic networks with high dielectric permittivity and self-healing properties

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... Overview of the improved properties

More than 100% elongation of the reassembled samples

Increasing in LIFE-TIME of DEs

<table>
<thead>
<tr>
<th></th>
<th>$Y=3G'$ [kPa] (0.01 Hz)</th>
<th>$\tan\delta$ (rheo) (0.01 Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure PDMS</td>
<td>64.3</td>
<td>0.06</td>
</tr>
<tr>
<td>Commercial silicone LR3043/30</td>
<td>252.3</td>
<td>0.08</td>
</tr>
<tr>
<td>AMS162 + B12</td>
<td>37.3</td>
<td>0.01</td>
</tr>
<tr>
<td>IPNs LR3043/30 : (AMS162+B12)</td>
<td>255.1</td>
<td>0.10</td>
</tr>
<tr>
<td>70 wt% : 30 wt%</td>
<td>255.1</td>
<td>0.10</td>
</tr>
<tr>
<td>50 wt% : 50 wt%</td>
<td>113.7</td>
<td>0.08</td>
</tr>
<tr>
<td>30 wt% : 70 wt%</td>
<td>30.9</td>
<td>0.05</td>
</tr>
<tr>
<td>10 wt% : 90 wt%</td>
<td>30.5</td>
<td>0.03</td>
</tr>
</tbody>
</table>