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

Ogliani, Elisa; Yu, Liyun; Skov, Anne Ladegaard

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

Elisa Ogliani (1), Liyun Yu (1), Anne Ladegaard Skov (1)

(1) The Danish Polymer Centre, Department of Chemical and Biochemical Engineering, Technical University of Denmark, 2800 Kgs. Lyngby, Denmark
2.2.5 Interpenetrating polymer networks based on commercial silicone elastomers and ionic networks with high dielectric permittivity and self-healing properties

Elisa Ogliani
Technical University of Denmark
elisa.ogliani@yahoo.it

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 = $\frac{\varepsilon'}{\gamma}$
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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>113,7</td>
<td>0,08</td>
</tr>
<tr>
<td>50 wt% : 50 wt%</td>
<td>30,9</td>
<td>0,05</td>
</tr>
<tr>
<td>30 wt% : 70 wt%</td>
<td>30,5</td>
<td>0,03</td>
</tr>
<tr>
<td>10 wt% : 90 wt%</td>
<td></td>
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</tbody>
</table>
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