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 = $\frac{\varepsilon'}{Y}$
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More than 100% elongation of the reassembled samples

Overview of the improved properties

<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></td>
<td>113.7</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>30.9</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>30.5</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Increasing in life-time of DEs
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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