Dielectric Electroactive Polymers powered by ELASTOSIL® Film

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Research on dielectric EAPs started in the early 1990s with the motivation to develop artificial muscles for robots from electroactive polymer actuators.[1] Although many elastomers can be used in principle, silicone elastomers show superior properties in the application like fast response time, reliability. With regard to physical properties like ageing or temperature stability silicone became the material of choice today.[2] Another important aspect for the application is to have very thin, defect free and precise layers of dielectric material in the order of 20 to 50 µm available. WACKER has developed a patented process for manufacturing these thin films under clean room conditions.

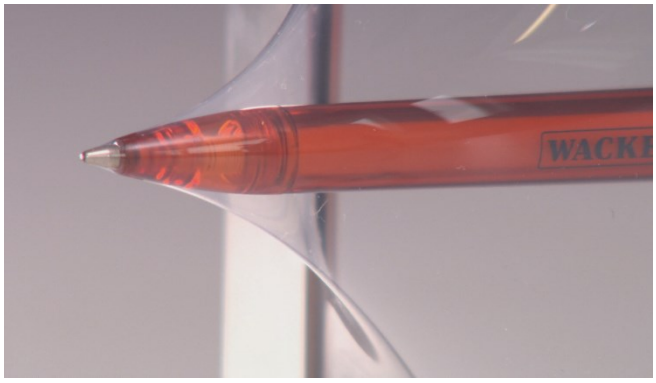

Figure 1. Picture of a 50 µm thin ELASTOSIL® Film 2030.

Dielectric transducers manufactured from ELASTOSIL® Film can be used to drive actuators (valves, switches) or generators for wave energy harvesting.[3] Recent developments are aiming at reducing the driving voltage for actuation to enable low-cost and safe electronics. With that progress on material properties, the DET technology is to be expected to grow rapidly and gain acceptance in a plurality of products.

[1] F. Carpi, D. de Rossi, R. Kornbluh, R. Pelrine, P. Sommer-Larsen, *Dielectric Elastomers as Electromechanical Transducers*, Elsevier, **2008**, *ISBN: 978-0-08-047488-5*.
[2] F. B. Madsen, A. E. Daugaard, Søren Hvilsted, A. L. Skov, *Macromol. Rapid Comm.* **2016**, *37(5)*, 378-413.
[3] B. Scherber, M. Grauer, A. Köllnberger, *Proc. SPIE 8687, Electroactive Polymer Actuators and Devices (EAPAD),* **2013**, 86870K.