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Friedrich-Alexander-Universität
Erlangen-Nürnberg



Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Dienstag, **03.07.2012, 17:00 Uhr**, Egerlandstr. 5, Raum 0.044

Study on mechanical and dielectric behavior of VHB 4910 for sensors and actuators applications

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Recent studies show that VHB 4910, an acrylic elastomer, can be a potential alternative material for many actuators and sensors applications. Due to highly nonlinear time dependent and frequency dependent material responses to mechanical and electrical stimulations, it is still very challenging to realize sensors and actuators from this material. Hence experimental investigations are necessary to characterize mechanical and dielectric behaviour of VHB 4910 prior to its applications for sensors and actuators. Attempts are made for accurate and precise experimental determination of mechanical behaviours such as nonlinear stress-strain, strain rate dependent hysteresis, cyclic softening and stress relaxation of this material. Experimental study has also been performed to determine frequency and stretch dependent dielectric constant of VHB 4910 film. Results show that the dielectric constant decreases with increasing frequency and stretch ratio. In this work we also explore the possible application of dielectric elastomer as sensor. Due to application of force, the thickness of the elastomer changes resulting change in capacitance. The change of capacitance is sensed with the help of electronics oscillator circuit which produces square wave whose frequency depends on the capacitance of the sample. The frequency to voltage converter circuit is used to obtain output DC voltage. So the thickness versus voltage curve is obtained which may be used to measure the capacitance hence the input force, elongation, pressure, etc. All these experimental results may be helpful for designers to characterize the performance of actuators and sensors fabricated with dielectric elastomer material.

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