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Madsen, Line Riis; Hassager, Ole; Skov, Anne Ladegaard

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Line Riis Madsen, Ole Hassager & Anne Ladegaard Skov
Department of Chemical and Biochemical Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark

Several electrical aging mechanisms are known to occur during operation of dielectric elastomers; some cause fast breakdown while others cause slow degradation of the dielectric elastomer. One of the most significant fast aging mechanisms is thermal breakdown. Thermal breakdown initiates when the heat produced within the elastomer, mainly joule heating, exceeds the heat loss to the surroundings. This may be either locally or macroscopically.

We strive to enhance the understanding of thermal breakdown in dielectric elastomer by performing numerical simulation of the actuation of dielectric elastomer transducers in stacked configuration. Multiple simulations using experimental data for PDMS have been performed using COMSOL Multiphysics, from which the key parameters affecting thermal breakdown have been identified. In this presentation we will present the findings and identify the optimal operating conditions for a PDMS dielectric elastomer in order to minimize thermal breakdown.