



Differential Scanning Calorimetric Analysis of Elastomers for Optimization of Extended Use

We have begun a collaboration with ITT Engineered Valves to analyze the valves distributed by ITT to their customers. The valves are composed of various elastomers, including a PTFE copolymer and EPDM (ethylene-propylene-diene monomer), and function as open/close operators for various liquids. The valves are heated and cleaned during moulding. However, information on the thermal stability is lacking. Often, repeated use of these valves leads to warping and cracking of the valve, which renders it useless. ITT is continually trying to find the optimal polymer composition that will minimize this degradation.

We are testing the thermal stability of various valves, using differential scanning calorimetry (DSC), to determine the oxidation induction time. We will test the valves at different temperatures and hold each temperature for varying durations. Monitoring the resulting endotherms, we will be able to pinpoint oxidation and degradation of the valves and, based on their composition, make suggestions as to the optimal valve material for extended use.

Student Researcher: Adam Dent

Faculty Advisor: Dr. Allen