

Aging mechanism of polyurethane foam via thermal and mechanical degradation

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Aging mechanism of polyurethane foam (PU) depends on thermal and mechanical degradation in aspects of its main applications. Existing researches have analyzed mechanical properties of aged PU foam or matrix in accordance with the temperature, heating time, organic liquid such as seawater, mechanical movements and vibrations. And there were some equations which correlate the levels of degradation factors with aged properties.

In this work, four mechanism are suggested to explain aging mechanism of PU. 'Compressive(mechanical)-aging mechanism', 'thermal-aging mechanism', 'Compressive-thermal-aging mechanism', and 'compressive-thermal mechanism for thr damaged foam' are throughly investigated by hysteresis loss, S65, S25, SAG factor, compression set, strut thickness density, swelling ratio, sol/gel fraction, and X-link density of aged PU foams.