

## DELAYED FRACTURE DUE TO TIME-DEPENDENT DAMAGE IN PDMS

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### ABSTRACT

Sustained loading at stress or strain levels below the static failure criteria of materials can lead to failure after a period of time, referred to here as delayed fracture. Analyzing and predicting delayed fracture is difficult due to its sensitivity to various experimental conditions and to the complex underlying mechanisms. Here we perform relaxation tests to study the delayed fracture of PDMS held at fixed stretch, using samples with blunt and sharp crack tips in a pure-shear test. Two types of delayed fracture are observed. For a blunt crack tip, upon stretching and holding, considerable time will pass before the sample fails dynamically. For a sharp crack tip, the crack begins to grow upon loading, but with a very slow speed. Based on the results of these two types of delayed fracture, a time-dependent damage model is developed and applied to predict the resulting slow crack growth.

### REFERENCES

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