Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Measurement and Modeling of the Effect of Aging on the Compressive Yield of Epoxy CAITLYN CLARKSON, JOHN D. MCCOY, New Mexico Institute of Mining and Technology, JAMIE M. KROPKA, ROBERT S. CHAMBERS, Sandia National Laboratory — Cylindrical specimens of a bisphenol A epoxy resin and polyetheramine curative were made following standard procedures and tested in compression over a range of temperatures and strain rates. The resin and curative were reacted to completion, annealed above Tg, and cooled at a controlled rate in order to define a known thermal history. The resulting stress-strain curves were analyzed for the yield stress. The yield stress is a highly non-linear property and is challenging for constitutive modeling to predict. The sensitivity of the yield stress to physical aging is probed by aging at temperatures 5 to 10 °C below the Tg before applying the compressive load. Yield stresses under the experimental conditions are predicted by the activated-process based Ree-Eyring theory as well as by the SPEC constitutive mode and compared to the experimental results. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Caitlyn Clarkson
New Mexico Institute of Mining and Technology

Date submitted: 14 Nov 2013 Electronic form version 1.4