1200° C and room temperature, while the behaviour at constant load seems to be due to a creep deformation mechanism that exists only at high temperatures.

It may be seen from the experimental data that the BN/Si/SiC compliant material is effective in relieving localized high stresses and providing impact resistance. With these data on impact resistance and erosion resistance, a balance can be obtained between impact and erosion resistance for a particular application. The information on strength and deformation characteristics for monotonic, cyclic and constant loading is needed to design compliant attachments which are necessary in the structural application of silicon carbide ceramic materials.

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R. L. MEHAN
G. G. TRANTINA
C. R. MORELOCK
General Electric Company,
Corporate Research and Development,
Schenectady, New York,
USA

Shrinkage as a measure of the deformation efficiency of ultra-oriented high density polyethylene: Authors' addition

It is proposed, with this letter, to offer a set of short additions to an earlier paper, of the same title, [1] that may be of aid to the reader.

In [1], the headings for Table I were omitted. They should read, from left to right, "Sample", "Extrusion temperature (° C)", "Extrusion draw ratio", "Recovery (%)", "Molecular draw ratio", and "Tensile modulus (GPa)"; see also the Erratum, this issue.

The definition previously published for the molecular draw ratio (MDR) requires alteration, see also the Corrigenda, this issue. For perfect elastic recovery in the shrinkage test, the correct equation is

$$\mathrm{MDR} = \frac{\Delta L}{L_0} + 1,$$

where $\Delta L = L_\mathrm{T} - L_\mathrm{S}$ and L_0 is the length prior to draw, L_T is the total length after draw and L_S is the shrunken length after draw.

There is a systematic set of draw ratios calculable from the die geometry for solid-state extrusion and consequent molecular response:

$$\mathrm{DDR} \geqslant \mathrm{EDR} \geqslant \mathrm{MDR} \geqslant [\Delta L/L_0] + 1,$$

where DDR is the die cross-sectional area ratio, EDR is the extrusion displacement of lines on the sample, MDR is the molecular draw ratio calculated from shrinkage, and $[\Delta L/L_0] + 1$ is the measured elastic recovery on reheating. All calculations assume a constant density during draw with the inequalities above representing measures of the inefficiency for the draw and subsequent recovery processes on reheating, with the latter being the difference between values obtained using the two above methods for calculating the MDR.

Silicone oil is preferred as the heating liquid for shrinkage tests, rather than the glycerol originally

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described. The silicone density leads to complete immersion of polyethylene samples (without solubility) which thus improves heat transfer leading to higher and more accurate values of the MDR of about 70% of the EDR value, compared with about 45% in the original paper, for comparable conditions of draw.

For the stipulated test conditions, the time required for melting and full shrinkage is about 30 seconds (using a heating rate $< 500^\circ \text{C min}^{-1}$) with the time for accurate measurement of recovery, depending upon sample geometry, generally less than two minutes. On more prolonged heating, polyethylene samples take on a spherical shape corresponding to conservation of surface energy, with the latter not reflecting the major force of rapid elastic recovery associated with the original chain extension developed on drawing by solid-state coextrusion.

Ref. 13 in [1] describes the extrusion of polyethylene powder but does not report shrinkage results. A better citation would be [2]. The correct page number for Ref. 8 of [1] is 197, see also the Corrigendum, this issue. We also recognize that the scale provided for Fig. 5 of [1] may be difficult to read, with the modulus always to have a non-zero value.

With the corrections and additions provided here, it is thus possible to fulfill the first conclusion of the original paper that under carefully controlled conditions, notably thin samples and fast heating rates, the shrinkage of orientated high density polyethylene (HDPE) on melting gives a quantitative measure of molecular extension on draw.

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ROGER S. PORTER
MARC DANIELS*
MICHAEL P. C. WATTS†
JOSE R. C. PEREIRA
STEVEN J. DeTERESA
ANAGNOSTIS E. ZACHARIADES‡
Polymer Science and Engineering Department,
Materials Research Laboratory,
University of Massachusetts,
Amherst,
Massachusetts 01003,
USA

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*Present address: Celanese Research Co., Summit, New Jersey, USA.
†Present address: Hewlett Packard Corporation, Palo Alto, California, USA.
‡Present address: IBM Research Division, San Jose, California, USA.