Modulus Measurement of Kedi Scintillators

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UVa
2016/2/4
Cut one shashlyk piece to make 8 samples, cross-section (1.52±0.02) by (8.06±0.03)mm
Instron testing machine in Mech. Eng. room 104

- Tensile Testing Setup

- Instron testing machine in Mech. Eng. room 104

- Tensile testing: sample pulled by two handles with force sensor (slipping happened for Kedi samples)

- Laser reading original length and extensions
Shashlyk Stripe Sample Tensile Test Results
(did not reach failure due to slipping)

Young's Modulus Measurement
Kedi Shashlyk Stripe Sample #1, Test #2
2/3/2016

**Stress (Pa)**

<table>
<thead>
<tr>
<th>Young's modulus (MPa)</th>
<th>3230.91</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength (MPa)</td>
<td>&gt;22</td>
</tr>
</tbody>
</table>

Young's Modulus Measurement
Kedi Shashlyk Stripe Sample #2, Test #2
2/3/2016

**Stress (Pa)**

<table>
<thead>
<tr>
<th>Young's modulus (MPa)</th>
<th>3031.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength (MPa)</td>
<td>&gt;20</td>
</tr>
</tbody>
</table>

Web data (metweb.com) for polystyrene: tensile modulus 3GPa; ultimate tensile strength 40MPa.
Control Measurement using 3D-Printed PLA (failure reached)

Young's modulus (MPa) | 2493.12
---|---
tensile strength (MPa) | 44.06
strain at tensile strength | 0.030

Published data: tensile modulus (3.2-3.5)GPa; ultimate tensile strength (48-60)MPa. – B.M. Tymrak et al. Materials and Design 58 (2014) 242-246
3-Point Bending (Flexural) Testing Setup

bending (shear) test: load applied to mid point of sample until breaking
Web Data for Polystyrene (matweb.com)

- Tensile modulus 3 GPa; tensile ultimate strength 40 MPa
- Flexural modulus 2.5 GPa; flexural strength 70 MPa
- Compressive modulus 2.5 GPa; compressive yield strength 70 MPa