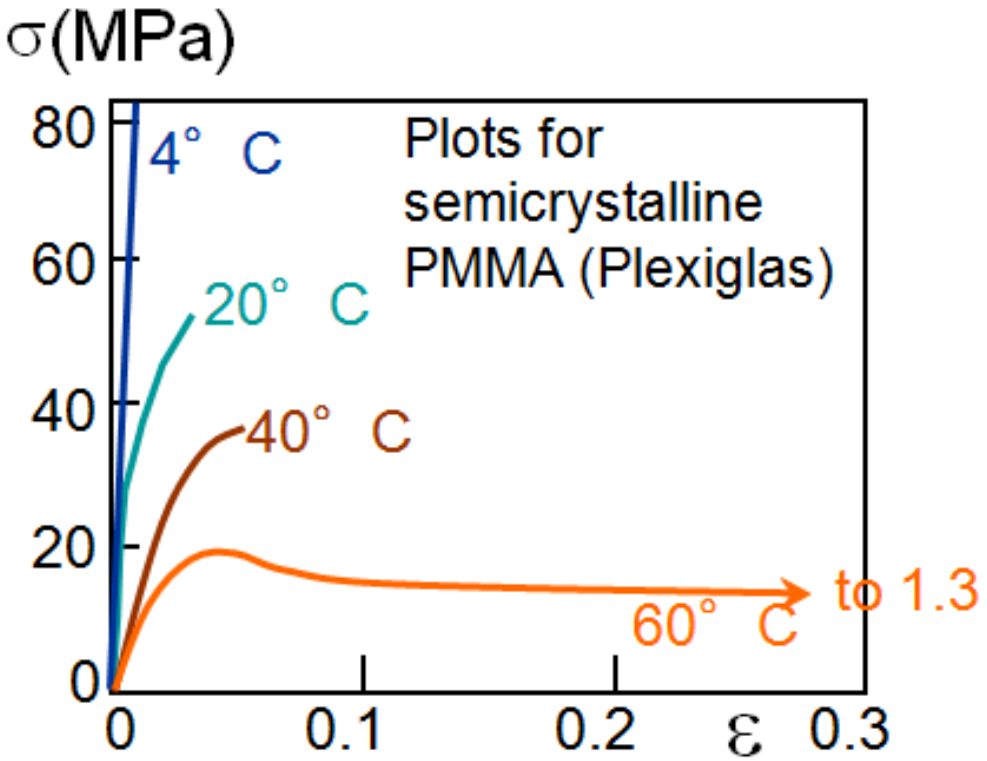
Standards

- **What is Standard?**
- **The need for Standards**
- **Material Testing and Characterization Standards**
  - Tension
  - Compression
  - Shear
  - Flexure
  - Hardness
  - Impact
  - Fracture Toughness
  - …….

Influence of T, Environment Condition and Strain Rate

- Decreasing *T*...
  -- increases *E*
  -- increases *TS*
  -- decreases %*EL*
- Increasing strain rate...
  -- same effects as decreasing *T*.
- Environment Condition



Adapted from Fig. 7.24, *Callister & Rethwisch 4e.* (Fig. 7.24 is from T.S. Carswell and J.K. Nason, 'Effect of Environmental Conditions on the Mechanical Properties of Organic Plastics", *Symposium on Plastics*, American Society for Testing and Materials, Philadelphia, PA, 1944.)

Standard Temperature

Test Temperature according to the ASTM Standards for Tension Testing

- **ASTM E8/E8M** (Metallic Materials): Room temperature (~10 to 38°C)
- **ASTM D638** (Plastics): Should be according to ASTM D618 (Practice for Conditioning Plastics for Testing)
  - Room temperature: 20 to 30°C

Standard Temperature

Test Temperature according to the ASTM Standards for Compression Testing

- **ASTM E9** (Metallic Materials): Room temperature
- **ASTM D695** (Rigid Plastics): Should be according to ASTM D618 (Practice for Conditioning Plastics for Testing)
  - Room temperature: 20 to 30°C

Standard Speed of Testing

Speed of Testing according to the ASTM Standards for Tension Testing

- **ASTM E8/E8M** (Metallic Materials)
  - Crosshead Speed (to determine yield properties): 0.015 ± 0.003 mm/mm/min
- **ASTM D638** (Plastics): Speed of Testing for Rigid Plastics
  - Specimen Type I: 5 mm/min

Standard Speed of Testing

Speed of Testing according to the ASTM Standards for Compression Testing

- **ASTM E9** (Metallic Materials): Nominal rate of 0.005 m/m/min
- **ASTM D695** (Rigid Plastics): 1.3 ± 0.3 mm/min