Ductility Encyclopedia Article

Ductility

The following sections of this BookRags Literature Study Guide is offprint from Gale's For Students Series: Presenting Analysis, Context, and Criticism on Commonly Studied Works: Introduction, Author Biography, Plot Summary, Characters, Themes, Style, Historical Context, Critical Overview, Criticism and Critical Essays, Media Adaptations, Topics for Further Study, Compare & Contrast, What Do I Read Next?, For Further Study, and Sources.

(c)1998-2002; (c)2002 by Gale. Gale is an imprint of The Gale Group, Inc., a division of Thomson Learning, Inc. Gale and Design and Thomson Learning are trademarks used herein under license.

The following sections, if they exist, are offprint from Beacham's Encyclopedia of Popular Fiction: "Social Concerns", "Thematic Overview", "Techniques", "Literary Precedents", "Key Questions", "Related Titles", "Adaptations", "Related Web Sites". (c)1994-2005, by Walton Beacham.

The following sections, if they exist, are offprint from Beacham's Guide to Literature for Young Adults: "About the Author", "Overview", "Setting", "Literary Qualities", "Social Sensitivity", "Topics for Discussion", "Ideas for Reports and Papers". (c)1994-2005, by Walton Beacham.

All other sections in this Literature Study Guide are owned and copyrighted by BookRags, Inc.

Contents

Ductility Encyclopedia Article.....1

Contents.....2

Ductility.....3

Ductility

When a crystalline body is subjected to an applied force, it will, under most circumstances, undergo a change in shape. If the forces are small, the deformation will be elastic, i.e., the material will revert to its former shape as soon as the external forces are released. If, however, the forces are sufficiently large, the material will only partly revert to its original shape when they are released. Such deformation is referred to as plastic.

At high enough stresses, irreversible processes accompany deformation. Brittle materials break into separate pieces (i.e., fracture or mechanically fail) at the point at which the applied stress exceeds the value at which there is no further plastic deformation.*Ductile* materials, on the other hand, exhibit a time-dependent extension (i.e., one that depends on how fast the material is stressed) that is not recovered when the stress is removed. The ductility of a material is characterized by the strain (or elongation) at fracture; the more ductile a material is, the easier it is to draw that material into a wire. The **metals tungsten** and **copper** both exhibit very high ductilities. Here strain is defined as the relative change in dimensions or shape in a body as the result of an applied stress (it is a dimensionless quantity); stress is the magnitude of the applied force per unit area (usually measured in units of pounds per square inch or pascals).

Certain types of metals undergo a transition from ductile to brittle fracture when the **temperature** is decreased sufficiently, the strain rate is increased sufficiently, and/or the surface of the metal has been notched. The ductile to brittle transition temperature is typically measured by the change in **energy** absorbed, the change in ductility, or the change in the fracture appearance.