

Advances in Engineering Materials
(For Structural Applications)

PRODUCTION

cost and high hardness material for Modern material challenges and the need for better materials in
nding applications such as cutting tools. Materials selection criteria for cutting tools and procedures

ADVANCED TOPICS IN METALS

ngthening mechanisms based on reducing dislocation mobility such as work hardening, grain size
ement, precipitation hardening, martensite transformation, alloying. Special topics such as advanced
ng Tools Materials and their applications.

ADVANCED TOPICS IN POLYMERS

thermoplastics and thermosets. Advanced thermoplastics which are semi-crystalline, liquid crystalline,
phous and pseudo-thermoplastics. Polymer crystallinity, copolymers, polymeric fibers such as
etra" and "Kevlar", ABS family of polymers and applications.

ADVANCED TOPICS IN CERAMICS

duction of Ceramics, Crystalline ceramics, amorphous ceramics; glass-ceramics. Static fatigue,
bility, thermal shock resistance, martensite-type reactions in ceramics, stabilization of zirconia,
hened ceramics, processing ceramics. Application of advanced Ceramics cutting tool Materials.

COMPOSITE MATERIALS

initions and classifications. Nanocomposites, dispersion strengthened composites, particulate
posites, composites with short reinforcements, composites with continuous reinforcements, natural
r reinforced composites, methods of preparation, properties and applications. Cutting tool applications
Composite Materials

References:

- John D. Verhoeven, *Fundamentals of Physical Metallurgy*, Wiley, 1989.
Alan Russell and Kok Loong Lee, *Structure-Property Relations in Non-Ferrous Metals*, Wiley, 2005.
Alfred Rudin and Phillip Choi, *The Elements of Polymer Science and Engineering*, Third Edition,
Wiley, 2012.
David W. Richerson, *Modern Ceramic Engineering: Properties, Processing and Use in Design*, Third
Edition, Marcel Dekker, 2005.
Chawla, Krishan K., *Composite Materials: Science and Engineering*, Springer, 2012.

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