

# MATERIALS SCIENCE

# МАТЕРИАЛОВЕДЕНИЕ

*Допущено Министерством образования  
Республики Беларусь в качестве учебного пособия  
для иностранных студентов учреждений  
высшего образования по профилю образования  
«Техника и технологии»*

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В учебном пособии изложены основы материаловедения машиностроительных материалов на основе металлов, полимеров, керамик, древесины и др. Приведены сведения о физико-химических процессах формирования структуры материалов при различных видах энергетических воздействий. Для всех типов материалов дан анализ взаимосвязи структуры и свойств материалов. Рассмотрены технико-экономические аспекты обоснованного выбора материалов при создании различных машин и механизмов.

Впервые описана ведущая тенденция современного материаловедения: эволюция материалов от обычных к многофункциональным, далее к активным, а затем к «умным», уделено внимание специальным материалам, а также методам инженерии поверхности и высокоэнергетическим технологиям модифицирования поверхностных слоев машиностроительных изделий, высокоскоростной кристаллизации материалов, нанесению покрытий и др.

Пособие предназначено для студентов, магистрантов и аспирантов машиностроительных специальностей вузов.

The book expounds the basics of materials science of engineering materials based on metals, polymers, ceramics, wood, and others. The information is given about the physical and chemical processes of materials structure formation for different types of energy impacts. For all types of materials provided, the relationship of structure and properties of materials is analyzed. The technical and economic aspects of the grounded choice of materials to create a variety of machines and mechanisms are considered.

The book for the first time sets out the leading trend of modern materials science: the evolution of materials from conventional to multi-functional, further to the active, and then to the "smart" ones. Attention is paid to special materials, as well as methods of surface engineering and high-energy technologies of modification of the surface layers of machine-building products, high-speed crystallization of materials, coating, etc.

The book is intended for students of engineering specialties of universities. It will be useful also for undergraduates and postgraduate students.

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