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Perspectives of Physics in Materials Science Research

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Abstract

Basic research in science tends to focus on the fundamental properties of the natural world. In this talk, a brief overview of the various stages of development of materials science research is being presented. The evolution of materials with times has been discussed. The materials can be classified as polymers, metals and ceramics as they find wide array of applications, starting from automotive, electronics, biomedical, pharmaceutical, construction, aerospace, defence, textile and sports.

Materials science is a multidisciplinary field involving the properties of matter and the relationship between the structure of materials at atomic or molecular scales and their macroscopic properties. In recent years, many physicists have turned their attention to nanotechnologies, including the making of nanocomposites and biomimetics, along with electronic polymers. Many groups of researchers are active in studying the dynamic evolution of materials, including thin film growth, patterned surfaces, electrochemical interfaces, polymers, liquid crystals, biomaterials and systems with novel electronic properties. The molecular structure of the materials can be engineered chemically as well as physically at the nano level through several routes and processing. The nanomaterials are very important and they have applications in every sphere of life including physics, chemistry, biology, medicine, engineering and technology. The new tools to further understanding, including new forms of scanning-probe microscopy for use in characterizing phenomena on the nanometer scale are being discussed in the talk.