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Materials, Science and Biosystems

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Editorial

Metals either in native state or after extraction from ores have played vital role in the civilizational development. The requirement of corrosion resistance limits the number of metals that can be employed in internal medicine. The most common examples of metals in use are gold, silver and silver amalgam, titanium and stainless steels. Currently metallic parts prepared by powder metallurgy technique have been very common as bio-implants.

The 20th Century had been a landmark in placing metal science as a discipline, which took active inputs from physics, chemistry and mechanics. The bioscience, which had its earlier role in metal extraction, is going to make a dent with nanomaterials and nanotechnology. In near future, the discipline of material science is going to be named as 'Molecular Science'. It is worth mentioning about Arthur von Hippel (1898-2003), an eminent professor at MIT, who wrote his famous book 'Molecular Science and Engineering'. After retirement from MIT is 1964, he started a new line of study that he continued until 1980. His research built the physical foundation of new biology. His last scientific paper published in 1979 was titled 'From atoms to living systems' (A.R. von Hippel, Materials Research Bulletin, 14, 1979, 273). Another message to be conveyed is that materials science, historically, always interacted with basic sciences and is continuing. A strict puritan approach is undesirable for long range growth, since the call of the day is the structure- properties-processing - performance interaction, which is complex, but at the same time challenging.

Depending on the type of applications, the material may be classified as bio-inert, bioactive and biodegradable. Sintered porous titanium is used for dental implants. Ceramic materials have also found significant place in bio-systems and there is fairly good competition with metals. One of the biggest problem in bio-implants is that ideally they should not get affected by the host tissues, bone and body fluids. Of late, much attention of scientists throughout the world is on the interaction of tissues with materials. Biological cells sense their physical environment and translate mechanical forces or geometries into biochemical signals enabling them to adapt to cues in the surroundings. Nanometals and devices play a significant role in such studies.

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