



Σ Ε Μ Ι Ν Α Ρ Ι Ο

Carbon allotropes as super-materials

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Abstract

Materials made entirely of carbon, i.e. its allotropes, can rightly be called super-materials. Their properties are often at the extremes of the distribution of physical properties of known materials. They are often 'best in class' in diverse areas, such as thermal and electrical conduction, strength, hardness, stiffness and so on. They can also be engineered during growth, or doped, to swing properties from insulator to superconductor, from solid lubricant to abrasive.

The physical and chemical foundation for the exceptional and divergent properties of carbon allotropes (diamond, graphite, fullerenes, nanotubes, graphene and more) will be discussed in terms of their bonding, their geometry and their industrial uses, now and in the future.