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Stable isotopes in nanotechnology

ABSTRACT. The existence of isotopes is one of the prime and well known facts of physics and chemistry. Several major areas of science and technology, such as nuclear power engineering, nuclear medicine, isotopic geology (e.g., carbon dating) and a few others are fundamentally based on isotopes. Most of these applications make use of radioactive isotopes. The use of stable isotopes of chemical elements is a much smaller niche, both at technological and economical levels. For example, in key areas of micro- and nanotechnology, from information processing systems to biological and medical applications, there is almost no use of the stable isotopes (isotopic diversity). However, in view of the fact that stable isotopes of the same elements vary (at least slightly) in their physical and chemical properties, there is a room for a purposeful exploitation of these differences. This article reviews some ideas on the use of the diversity of stable isotopes (isotopic engineering) with an emphasis on nanostructures and nanotechnology in general.

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