

Scientists use nanocrystals as dopants

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U.S. scientists discovered that nanocrystals can mimic atoms in solid-state devices by altering their electrical properties, thereby acting as dopants.

Jeffrey Urban and colleagues at IBM's Watson Research Center investigated the electrical properties of films obtained by the aggregation of PbTe and Ag₂Te nanocrystals. When comparing the conductivity of films with different proportions of the two constituents, they found that when both types of crystals were present, the conductivity could be up to three orders of magnitude higher than in either of the single-component cases.

Nanocrystal assemblies can be seen as materials in which the nanocrystals -- consisting of thousands of atoms -- act as the basic elements, with the advantage that the structure can be precisely designed.

The researchers said the extension of the nanocrystal-atom analogy to the concept of doping -- the process of adding an impurity to modify electrical properties -- opens unexpected opportunities for the design of solid-state devices based on such aggregates.

The study appears in the current issue of *Nature Materials*.

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