

Researchers create the first thermal nanomotor in the world

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Researchers from the UAB Research Park have created the first nanomotor that is propelled by changes in temperature. A carbon nanotube is capable of transporting cargo and rotating like a conventional motor, but is a million times smaller than the head of a needle. This research opens the door to the creation of new nanometric devices designed to carry out mechanical tasks and which could be applied to the fields of biomedicine or new materials.

The "nanotransporter" consists of a carbon nanotube - a cylindrical molecule formed by carbon atoms - covered with a shorter concentric nanotube which can move back and forth or act as a rotor. A metal cargo can be added to the shorter mobile tube, which could then transport this cargo from one end to the other of the longer nanotube or rotate around its axis.

Researchers are able to control these movements by applying different temperatures at the two ends of the long nanotube. The shorter tube thus moves from the warmer to the colder area and is similar to how air moves around a heater. This is the first time a nanoscale motor is created that can use changes in temperature to generate and control movements.

The movements along the longer tube can be controlled with a precision of less than the diameter of an atom. This ability to control objects at nanometre scale can be extremely useful for future applications in nanotechnology, e.g. in designing nanoelectromechanical systems with great technological potential in the fields in biomedicine and new

materials.

The research has been published in the online journal *Science Express*.

Source: Universitat Autònoma de Barcelona

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