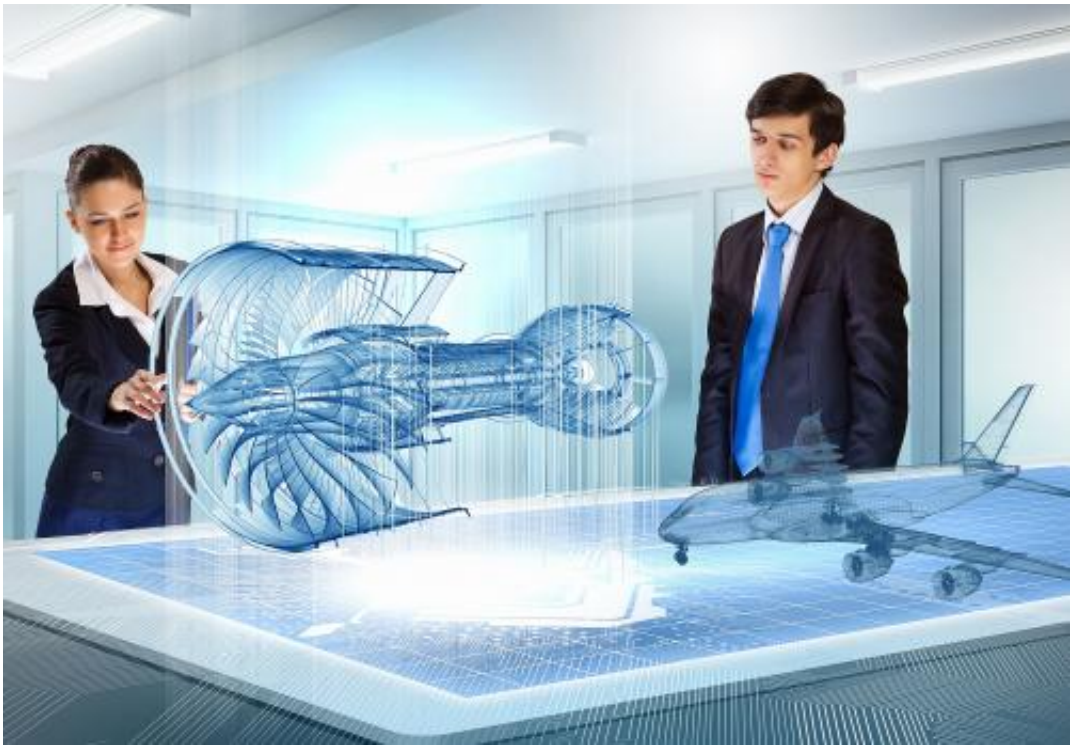
Experts create unique nanoparticles for aerospace industry

September 23 2014



A development of three universities enables improved thermal and electronic properties on devices with nickel-titanium alloys.

Experts collaborated to produce nanoparticles made of a titanium-nickel alloy used in the development of thermal and electrical sensors that control the operation of high-tech devices such as those used in

aerospace, among others, said Enrique López Cuéllar, doctor for the Autonomous University of Nuevo León (UANL), Mexico.

Federal Universities of Pernambuco and Campina Grande, both in Brazil, were responsible for obtaining physical media for the shape memory titanium-nickel metal alloy (with the ability to return to its original state after being deformed). Meanwhile, the team at the UANL manufactured nanoparticles used in the sensors, and after a series of tests confirmed the effectiveness of the titanium-nickel as an electrical and thermal conductor.

With nanoparticles, they produced temperature-sensitive devices that transmit electrical energy to the system but do not cause overheating. So when it finally reaches 50 degrees Celsius, the sensor stops dilating and enters a paused state; minutes later, when its temperature and size return to normal it activates again to control the operation of valves, boilers or gas dispensers, said López Cuellar.

Manufacturing methods of the alloys are very specific, so the Brazilian universities obtained them by vacuum melting the titanium to make it react with oxygen. In general, this process is expensive, so the idea was to reduce costs.

Then nanoparticles were obtained by thermal evaporation techniques where the molecular bonds of the metals degraded as a powder and then collected individually.

Besides generating nanoparticles for sensors, another goal of this proyect is to train high level human resources in the areas of metallurgy alloys with shape memory, nanotechnology and improving infrastructure in order to impact scientific and technological production in both countries.

Finally, to test the effectiveness of the material, a special machine in which the sensors are located between two points of electrical contacts, electric power is applied and removed for some time, whith the purpose of determining how long it takes to return to its original condition.

Provided by Investigación y Desarrollo

Citation: Experts create unique nanoparticles for aerospace industry (2014, September 23)

retrieved 25 April 2024 from
https://phys.org/news/2014-09-experts-unique-nanoparticles-aerospace-industry.html

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