

Size matters in determining strength of metals, inorganic material

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A new research technique developed by a team of researchers including Jeff Florando of DOE's Lawrence Livermore National Laboratory has shown that **the mechanical properties of nickel and some of its alloys - such as their ability to resist permanent deformation under stress - are directly affected by the material's dimensions.** The research, reported recently in *Science*, suggests that as the size of a specimen shrinks to a few microns (millionths of a meter) or less, the mechanisms by which the sample deforms can be strongly affected.

"This finding is important because of the increasing use of materials with micron-size dimensions in the miniaturization of electronic devices and other equipment," Florando said. "These physical conditions need to be taken into consideration when attempting to determine the strength of a given material." Florando said the research team, led by Michael D. Uchic of the Air Force Research Laboratory in Dayton, Ohio, developed a new technique for testing materials at the microscale using a Focused Ion Beam microscope and a nanoindentation system to create and test micron and sub-micron scale compression samples.

Source: DOE Pulse

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