



Material Science in the News

July 31, 2013. Highly oriented pyrolytic graphite crystals make the first hard x-ray laser resonator possible, showing the way to a hard x-ray laser system with numerous possible applications. Researchers at Shanghai Jiao Tong University (China), together with University of California (Irvine, CA), are working to build this type of x-ray laser resonator, combined with an amplifying medium, into a [small, table-top size, keV x-ray laser](#).

August 7, 2013. An international team of scientists, using the Advanced Photon Source (APS), have devised a way to [overcome the distortion caused by sample environments](#) used with X-rays so as to improve spatial resolution imaging by two orders of magnitude. This 30-nanometer resolution greatly reduces uncertainties for studies of nanoscale materials. Researchers expect to fine-tune the technique to reach resolutions of a few nanometers in subsequent experiments.

August 8, 2013. Born from small patches of a rapidly cooled mixture of aluminum, iron and silicon, researchers have identified a new substance that refuses any kind of label, first failing to exhibit the extended ordering of atoms indicative of crystal, and second growing outward from "seeds," which glass most certainly does not. Dubbed it "[q-glass](#)," X-ray diffraction reveals the substance has neither rotational or translational symmetry -- both of which are found in crystal. However, unlike glass, the atomic arrangement does not appear to be random, either.

August 9, 2013. In a series of campaigns, led by Lawrence Livermore National Laboratory's Yuan Ping using the OMEGA laser at the Laboratory for Laser Energetics (LLE) at the Univ. of Rochester, researchers [compressed iron up to 5.6 million atmospheres](#) (5.6 million times the pressure at the Earth's surface), a record pressure for solid iron.

August 12, 2013. Researchers in India have demonstrated that biosynthesized [silver nanoparticles show antimicrobial properties](#). Silver nanoparticles produced by fungal biomass have been shown to inhibit the growth of a strain of Salmonella.

August 15, 2013. Researchers at Syracuse University, led by Prof. Mathew M. Maye, have figured out how to [synthesize nanomaterials with stainless steel-like interfaces](#). Their discovery may change how the form and structure of nanomaterials are manipulated, particularly those used for gas storage, heterogeneous catalysis and lithium-ion batteries.

August 16, 2013. A Rice University group, led by Junrong Zheng in conjunction with Oak Ridge National Laboratory, has improved upon its ability to determine molecular structures in three dimensions in ways that challenge long-used standards. By [measuring the vibrations between atoms](#) using femtosecond-long laser pulses, the Rice lab of chemist Junrong Zheng is able to discern the positions of atoms within molecules without the restrictions imposed by X-ray diffraction (XRD) and nuclear magnetic resonance (NMR) imaging.