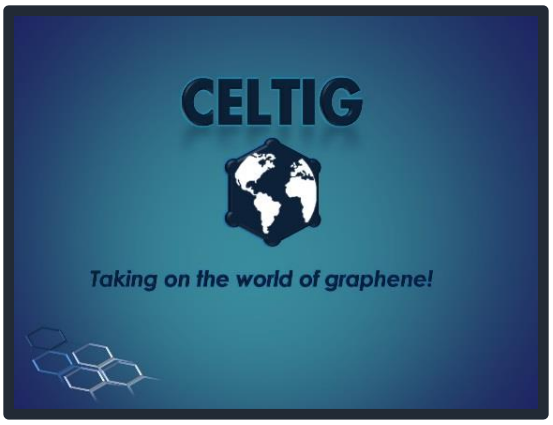
Archive of Graphene Research

Graphene has captured the interest of scientists and engineers worldwide, and the technical and popular scientific literature has grown exponentially with articles exploring many different facets of graphene application. Here is a list of some of the most interesting recent articles that are available via open web access.



Self-dispersed crumpled graphene balls in oil for friction and wear reduction, by X. Dou et al., *Proc. Nat. Acad. Sci*., vol 113, iss. 6, 2016, pp. 1528-1533; http://www.pnas.org/content/113/6/1528.abstract.

> Ultrafine particles made of crumpled graphene possessing spherical shape are shown to disperse well in motor oil lubricants. These additives reduce engine friction and increase gas mileage much greater than other types of additives at lower weight fractions (0.01-0.1 wt%). All-around, these spherical graphene nanoparticles exhibit stable and superior tribological performance in a variety of tests.

Graphene Fiber: A New Trend in Carbon Fibers, by Z. Xu and C. Gao. *Materials Today*, Vol. 18, Iss. 9, November 2015, pp. 480–492; http://dx.doi.org/10.1016/j.mattod.2015.06.009.

> This review article summarizes current and projected methods for fabrication of sprouted graphene fibers and their associated mechanical and functional properties. Various applications for use as multifunctional textiles are also discussed.

Molecular Modeling Combined with Advanced Chemistry for the Rational Design of Efficient Graphene Dispersing Agents, by K.D. Papadimitriou et al., *ACS Macro Letters*, Vol. 5, 2016, pp. 24-29; http://dx.doi.org/10.1021/acsmacrolett.5b00755.

> Graphene particles have proven to be difficult to disperse in polymeric materials, which is a barrier to numerous applications in the nanocomposites industry. This article describes a computational modeling approach to determining the ultimate dispersing properties of graphene nanosheets within polymer matrices.

Graphene is Missing Ingredient to Help Supercharge Batteries for Life on the Move, M. Douthwaite, *The Conversation*, August 2015; http://theconversation.com/graphene-is-missing-ingredient-to-help-supercharge-batteries-for-life-on-the-move-44867.

> New applications of graphene are discussed in the general area of power storage devices as reducing the size, weight, and operability of battery systems. Further potential future applications are discussed with respect to a decentralized power grid, electric automobiles, etc.

New Graphene-based Inks for High-speed Manufacturing of Printed Electronics, University of Cambridge, *Science Daily*, October 19, 2015; http://www.sciencedaily.com/releases/2015/10/151019072155.htm.

> This article describes a new, high-speed and low-cost process for printing graphene inks on conventional printing equipment, thus opening up a huge new potential market for graphene. Extensions of the technology could lead to practical high-tech applications such as printable electronics and sensors.

The Rise of Graphene, NA.K. Geim and K.S. Novoselov, *Nature Materials*, Vol. 6, March 2007, pp. 183-191; http://dx.doi.org/10.1038/nmat1849.

> This is one of the first review articles on the potential applications of the newly discovered material called graphene by the Nobel Prize winning physicists who originally isolated it.

Effects of Defects on the Intrinsic Strength and Stiffness of Graphene, A. Zandiatashbar, et al., *Nature Communications*, Vol. 5, Art. # 3186, 2014; http://dx.doi.org/10.1038/ncomms4186.

> This article discusses at length how material defects in planar graphene sheets can affect its intrinsic mechanical properties. An interesting conclusion is drawn between the Raman spectra of defective graphene with respect to its inherent mechanical properties.

Graphene-based Carbon-layered Electrode Array Technology for Neural Imaging and Optogenetic Applications, by D.-W. Park, et al., *Nature Communications*, Vol. 5, Art. # 5258, 2014; http://dx.doi.org/10.1038/ncomms6258.

> This article describes a new graphene-based, carbon-layered electrode array device that can be used for high-resolution neurophysiological recording. Optical transparency of the device is greater than 90% transmission over the ultraviolet to infrared spectrum and its potential utility is demonstrated through a series of optical interface experiments for neural applications.

Graphene-Protein Field Effect Biosensors: Glucose Sensing, by S. Viswanathan, et al., *Materials Today*, Vol. 18, Iss. 9, November 2015, pp. 513-522; http://dx.doi.org/10.1016/j.mattod.2015.04.003.

With chronic diseases, such as diabetes, becoming increasingly more prevalent, self-monitoring point-of-care (POC) devices, such as glucometers, have become common in household and clinical settings. This article explores the possible uses of functionalized graphene for such POC devices, such as binding enzymes to the graphene surface and integration into a microfluidic platform.