Engineering of an Ultra-Thin Molecular Superconductor by Charge Transfer

OU ID: #09026

Overview

Prof. Hla and his collaborators have engineered an ultra-thin, nanometer scale organic superconductor. These miniaturized superconducting materials show promise in a wide variety of applications for electronic components and devices. Several potential uses for these new materials include SQUID and SMES devices, superconducting electromagnets, digital circuits, computer data and energy storage units.

These researchers found a striking structural transformation occurs when GaC14 is vacuum deposited on bis(ethylenedithio)tetraselenafulvalene (BETS) that has been pre-deposited on a Ag(I II) surface. Their fabrication method results in more structured and higher organized charge transfer state of an ultra-thin superconductor consisting of one molecular layer of BETS and molecular rows of GaCl 4.

Superconductors are elements or compounds that conduct electricity without resistance below a certain threshold temperature (currently in the range of few degrees Kelvin). The possibility of using such materials at elevated temperatures can completely revolutionize our energy future, having the potential to offer unlimited savings in energy consumption, storage and transportation. From the time of its discovery, most efforts on superconductivity have been focused on engineering nanometer size superconducting devices having favorable temperature profiles. This effort succeeds in the potential miniaturization of such devices.

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Commercial Application

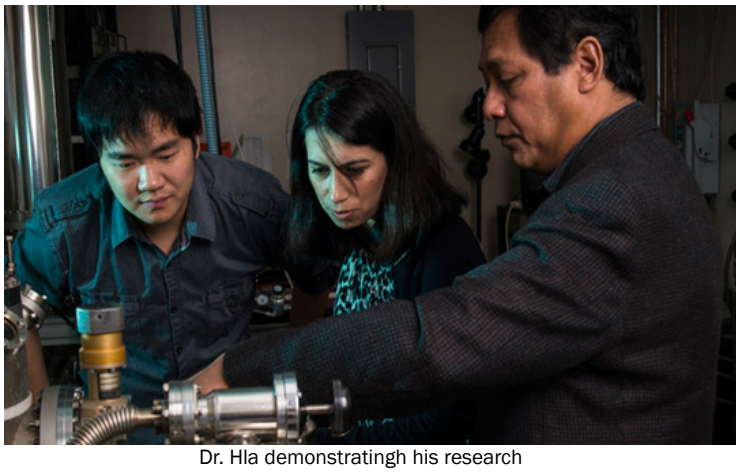
- Superconductors can be applied in various means of transportation and electric energy uses, potentially producing billions of dollars savings in energy consumption.
- There are potential spin-offs in multi-billion dollar industries in computer technology, microchip manufacturing, electromagnets, magnetic bearings, military, space technologies, science, and medicine.

Benefits

- Ultra-thin model allows nanometer applications yielding high conductivity at favorable temperatures.
- May be implemented in any of several previously stated industries

Inventor

Saw-Wai Hla, Ph.D. is a professor of physics and astronomy here at Ohio University's Clippinger Laboratory. Dr. Hla has been working with semiconductor technologies for some time now and is currently working on bringing this technology to market. Licensing opportunities are available.



Dr. Hla demonstratingh his research

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