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# Press Release

## **Advanced Diamond Technologies Licenses Patent Applications for Composite Materials of Ultrananocrystalline Diamond™ and Carbon Nanotubes**

**Champaign, IL, June 15, 2005:** Advanced Diamond Technologies, Inc. (ADT) today announced that it has licensed several U.S. and foreign patent applications from Argonne National Laboratory (ANL) for composite materials including composites made of ADT's Ultrananocrystalline diamond (UNCD™) and carbon nanotubes (CNTs).

UNCD, which is available commercially, is characterized by exceptional hardness, outstanding surface and bulk properties and tunable electrical conductivity. Carbon nanotubes are among the strongest materials on Earth and exhibit a remarkable range of mechanical and electrical properties different than diamond. Combining UNCD and CNTs will enable a whole new class of high-performance materials with applications suitable for cold-cathode electron sources, electronic devices and MEMS [microelectricalmechanical systems].

"Having a commercial outlet for such groundbreaking research assures that the fruits of this work will reach industry in a timely manner," said Stephen D. Ban, Director of the Office of Technology Transfer at Argonne National Laboratory.

The discovery made by researchers at ANL allows for UNCD and CNTs to be grown simultaneously into a fully dense thin film material, and for the relative fraction of the two forms of carbon to be controlled. Such a combination may yield materials which have the hardness and stiffness of diamond and the superior electrical and thermal transport properties of carbon nanotubes.

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Techniques are being developed to control where the UNCD grains and CNTs are located within the films.

“Combining the two most valuable forms of carbon—diamond and carbon nanotubes—gives rise to unimaginable possibilities for new types of performance materials and coatings”, said ADT President Neil Kane.

UNCD, known for its superior ability to integrate with other materials, is distinct from other forms of diamond films in that UNCD’s grain sizes are approximately 5 nanometers in diameter. These small grains give rise to UNCD’s novel properties. UNCD is being evaluated as a protective coating in friction and wear applications, in MEMS, NEMS [nanoelectricalmechanical systems], RF-MEMS [radio frequency MEMS], as a hermetic coating for biomedical implants and as compact electron sources.

The research at ANL on UNCD-CNT composites was led by Dr. John Carlisle and Dr. Orlando Auciello. Carlisle and Auciello are the scientific founders of ADT.

The work done on this hybrid material is featured on the cover of the June 17, 2005 issue of the journal *Advanced Materials*. A link to the article can be found on ADT’s website at:

[www.thindiamond.com](http://www.thindiamond.com).

About Advanced Diamond Technologies, Inc.

ADT, formed in December 2003, provides diamond thin-films and materials integration solutions to a variety of industry participants and in a variety of application areas. It is based in Champaign, IL. Its website is [www.thindiamond.com](http://www.thindiamond.com).

About Argonne National Laboratory

Argonne is one of the U.S. Department of Energy's largest research centers. It is also the nation's first national laboratory, chartered in 1946. Its website is [www.anl.gov](http://www.anl.gov).

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