FEDERAL RESEARCH FUNDING DRIVES MATERIALS SUCCESS

Diamond-like Carbon

"...this technology will potentially ***save billions*** in fuel consumption, energy, medicine, and electronics."

Cutting tools coated with diamond-like carbon increase wear resistance up to 24x and reduce friction, saving energy and resources.

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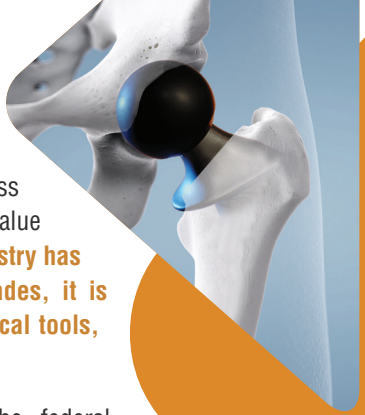
Diamond-like Carbon



Biocompatible diamond-like carbon-coated artificial hip joint

Summary: Diamond-like carbon (DLC) constitutes a class of super hard to semisoft carbon coatings with a market value of over $1 billion. **While the consumer automotive industry has employed this coating technology for over two decades, it is now seeing increased use in automotive racing, medical tools, electronics, and packaging industries.**

Fundamental and applied research supported by the federal government, including the National Science Foundation and U.S. Department of Energy, enabled the critical research and development that led to the adoption of DLC in new market sectors.

With continuing investment from government and industry, this technology will potentially save billions in fuel consumption, energy, medicine, and electronics. Application of super hard DLC coatings in the trucking industry alone is projected to save at least 1.2 billion gallons of fuel per year, saving over $37 million dollars in revenue at average fuel costs of $2.50 per gallon.

UNDERSTANDING DLC IN REAL-LIFE TERMS

Protects
100% biocompatibility with tissue, shielding medical implants in the human body

Extends
coated-part lifetimes by up to 24x

Reduces
friction wear in engines by 6x, projected to save over 23 billion gallons of fuel per year

Increases
engine performance by 3% on average

Sources 1. Hinüber, C., "Biocompatibility and Mechanical Properties of Diamond-like Coatings on Cobalt-Chromium-Molybdenum Steel and Titanium-Aluminum-Vanadium Biomedical Alloys" *Journal of Biomedical Materials Research Part A* 95A, no. 2 (2010): 388–400. doi:10.1002/jbm.a.32851 2. Council, N. R. "Status and Applications of Diamond and Diamond-Like Materials: An Emerging Technology" (1990): doi:10.17226/1508 3. Schuelke, T. "Boride-carbon hybrid technology to produce ultrawear and corrosion resistant surfaces for applications in harsh conditions" (2018): Available at: **mrs.org/biomedical-materials-research | mrs.org/diamond-like-carbon-prnewswire | mrs.org/diamond-like-carbon-market-research**

THANK YOU **Federal Research Funding** allows for these advances to continue impacting the world and improving the quality of life.

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