

FEDERAL RESEARCH FUNDING DRIVES MATERIALS SUCCESS

Two-Dimensional Materials

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Illustration of the ultrastrong
2D material graphene

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Two-Dimensional Materials

Summary: Two-dimensional (2D) materials are an emerging class of ultrathin materials with applications spanning several important sectors. From energy, where 2D materials are being developed for clean-fuel production and efficient solar cells; to medicine, where they advance wearable health sensors and cancer therapies; to flexible and low-power electronics; 2D materials are poised to have an enormous impact. **These materials are still largely in the fundamental research stage and are expected to have a market value of over \$300 million by 2027 as developments lead to commercial applications**^[1].

With a thickness of only a few atoms, 2D materials exhibit a unique combination of attractive properties, including flexibility and near transparency, enabling a wide range of applications not possible with traditional electronic materials. **These properties and the associated potential of 2D materials have led to intense interest, with thousands of publications on the topic as researchers begin to explore the possibilities**^[2].

The federal government has already begun to realize the importance of 2D materials on high-impact issues including energy independence and national security, as evidenced by funding from The National Science Foundation, the Departments of Energy and Defense, and others. This support drives the understanding needed to apply the unique properties of 2D materials to these critical topics. **Continued government support is necessary to ensure these 2D technologies reach full potential.**

Sources: 1. "Graphene, 2D Materials and Carbon Nanotubes: \$300 Million Markets, Technologies and Opportunities 2017-2027," Business Wire. 2018. Available: <https://www.businesswire.com/news/home/20180131005624/en/Graphene-2D-Materials-Carbon-Nanotubes-300-Million>.
2. Lin, Z. et al. APL Mater. 2018, 6 (8), 080701.

THANK YOU

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



2D materials will enable flexible electronics built into contact lenses to monitor health

UNDERSTANDING 2D MATERIALS IN REAL-LIFE TERMS

Adapts

2D materials are flexible, creating the potential to integrate them into the multi-billion-dollar flexible electronics market.

Reduces

cost, fuel, and emissions from aerospace and automotive industries through ultra-lightweight coatings and composites.

Cleans

ultrathin filters made from 2D materials can block contaminants in water.

Heals

2D materials can destroy cancer cells in mice, providing hope for future cancer treatment.