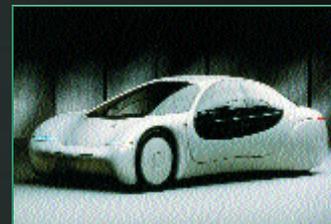
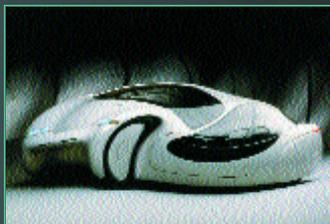
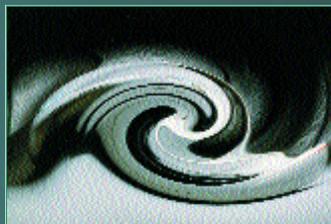


## MATERIALS



**S**tronger, lighter, and better insulating materials—the United States has received tremendous benefits from materials developments, particularly in the automobile industry. For example, new materials have allowed the introduction of lighter, yet stronger, automobile bodies and longer-lasting tires and batteries.

In a new era of miniaturization, researchers working at the atomic level have constructed a new class of advanced materials with properties far superior to those of conventional materials. These “nanophase” materials, which offer such characteristics as increased hardness, wear resistance, adhesion, and slipperiness, are useful in applications as diverse as microelectronics, automotive components, business machines, and even personal care products.

### Today's Market

Advanced materials offer benefits to diverse and growing markets, such as the automotive and nanotechnology industries. Stronger, lighter, and more affordable materials will help make the U.S. automotive industry more competitive. The chairmen of Chrysler, Ford, and General Motors each have stated that they expect 1997 U.S. vehicle sales to reach or exceed 15 million units.<sup>1</sup> Nanotechnology is here, and it is a multibillion-dollar worldwide industry with almost unlimited potential for growth. In particular, the nanophase materials market is expected to grow from \$300 million today to \$1.5 billion by 2001.<sup>2</sup>

### Tomorrow's Opportunity

BMDO research and development in materials has produced many innovations for ballistic missile defense systems. These innovations have been incorporated into new technologies that can help industry develop lighter automobile and satellite components, improve the thermal protection for aircraft flight data recorders, build higher-performance microelectronic devices, and produce smoother semiconductor polishes. The following section describes six such examples.

<sup>1</sup>American Automobile Manufacturers Association. 1996. Automotive Forecasts. World Wide Web at <http://www.aama.com/data/autofore.html>.

<sup>2</sup>British Parliament's Office of Science and Technology. World Wide Web at [http://www.nanotech.com/NanoVentures/NanoMarkets\\_frames/nanomarketsframes.html](http://www.nanotech.com/NanoVentures/NanoMarkets_frames/nanomarketsframes.html).