Valve Metals Can Be Coated Uniformly by Anodization

In the article, "Coatings for TiAl" (October *MRS Bulletin*, page 31), Shigeji Taniguchi describes several thermal processes for coating titanium aluminide materials with oxide surface films for the purpose of enhancing high-temperature oxidation resistance. The author describes the difficulty, for a variety of kinetic reasons, in obtaining uniform thermal oxide films.

I would like to point out that a wide variety of metals, including titanium and its alloys and intermetallic compounds with aluminum, fall into the broad category of materials known as "valve" metals. These materials form uniform oxide films via anodization in appropriate electrolytes. When anodization occurs under conditions resulting in the formation of dielectric-quality films, the oxide thickness is reproducible within a few tens of angstroms.

Titanium and other valve metals, alloys, and intermetallics may be readily coated with dielectric-quality films by anodization in polar, aprotic solvent solutions of phosphoric acid/soluble phosphates, as described in my British Patent application, GB 2,168,383, filed December 6, 1985. While the organic electrolyte anodizing process was developed with the electronics industry in mind, it is applicable also to the production of barrier oxide films for use as thermal oxidation barriers, prosthetic implant corrosion barriers, etc. Coatings may be produced to voltages well in excess of 500 volts, giving film thicknesses of over 10,000 angstroms.

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FROM WASHINGTON

Second Round of TRP Awards and Third Competition Announced

Second TRP Competition Completed

In late October, the second competition of the Technology Reinvestment Project (TRP) was completed with the announcement of 39 proposals selected for negotiation. The 224 U.S. defense and commercial firms, companies, universities, and state and local government organizations will receive more than $200 million in federal matching funds.

The TRP is a central part of the Clinton Administration's defense reinvestment and diversification initiative, mandated to help integrate the commercial and defense sectors into a single, cutting-edge technology and industrial base. The Department of Defense is leading the effort, with five other collaborating departments (Departments of Commerce, Energy, and Transportation; National Aeronautics and Space Administration; and the National Science Foundation).

In the area of environmental sensors, five proposals were selected for a total of $9.5 million in government funds, with the goal of developing field-deployable sensor technologies and real-time data processing, storage, and transmission systems. Such systems can be used to monitor harmful chemicals used in industrial manufacturing and to detect biological and chemical warfare agents.

The high-definition systems manufacturing area received three awards for a total of $48.3 million in government funds. This effort is directed toward the economical manufacture of flat panel displays.

High-density data storage systems account for two of the accepted proposals, with $16 million in funding to produce low-cost methods of magnetically or optically storing digital images, videos, and multimedia programs.

The area of low-cost electronics packaging had nine proposals approved at $38.3 million, including projects involving innovative electronic packaging, low-cost flip chips, wireless communications, and low-cost plastic packaging.

Three proposals are slated to receive a total of $21.6 million for room-temperature infrared sensors to facilitate nighttime military operations.

Three proposals for $19.5 million were awarded for object technology for rapid software development. Another five proposals worth $23.2 million are planned for interoperability testbeds for the National Information Infrastructure.

A detailed list of award selections and proposed projects, along with the amounts of the awards, is available by calling (703) 697-5737. To check on the status of proposals submitted, call 1-800-DUAL-USE.

Third TRP Competition Under Way

The third Advanced Research Projects Agency (ARPA) Technology Reinvestment Project competition was announced in late October. The TRP plans to allocate $415 million of FY94 and FY95 funding in this competition.

The competition will seek proposals in 13 technology development areas ($250 million available), including affordable polymer matrix composites for airframe structures, low-cost specialty metals processing, ceramic materials applications, and microelectromechanical systems applications.

Proposals are also sought for Regional Technology Alliances ($115 million available) and Manufacturing Education and Training efforts ($30 million available). Regional Technology Alliances are designed to enhance regional industrial ca-

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pabilities in critical dual-use technologies. Manufacturing Education and Training efforts retrain defense engineers and technicians for commercial industries and reorient engineering education for the manufacturing industries of the future.

Approximately $10 million has been allocated for Small Business Innovation Research (SBIR) phase-one proposals in the same 13 technology areas as the competition proposals; $10 million is available for phase-two efforts that are continuations from last year's selections. Cost-sharing and partnerships are required for all programs except Small Business Innovation Research. SBIR funds are available only to small businesses proposing to determine the scientific or technical merit and feasibility of a particular technology.

A new feature of this year's competition was the opportunity for participants interested in technology development or Regional Technology Alliances to submit five-page concept papers with their proposal ideas by December 21, so TRP can review the papers and provide feedback on their quality before the formal solicitation.

Formal solicitation is scheduled for publication in *Commerce Business Daily* on February 3, 1995, with proposals due on March 17. Proposals selected for negotiation are scheduled to be announced in June.

To receive the Program Information Package and other support materials, call 1-800-DUAL-USE, or fax your name and address to (703) 696-3813.

Other Programs

Other programs under the Defense Reinvestment, Conversion and Assistance statutes are being slated by ARPA for separate competition. These programs are the Advanced Materials Partnerships ($15 million), the Agile Manufacturing Pilot Program ($30 million), and MARITECH ($40 million).

The Advanced Materials Partnerships are designed to reduce the cost of components and devices manufactured from advanced materials and to demonstrate the effectiveness of collaboration between U.S. industry, academic institutions, state and local government, and federal laboratories.

This competition was scheduled to be announced formally in November, but details were not available at press time. □

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