Project Accomplishment Summary for
DOE Technology Transfer Initiative
Project 93-Y12P-086-C1

ELECTROLESS NICKEL BATH RECYCLE

Industrial Partners
Fidelity Chemical Products Corporation

March 22, 1996

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Prepared by the
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for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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PROJECT ACCOMPLISHMENT SUMMARY

Title: ELECTROLESS NICKEL BATH RECYCLE
DOE TTI No.: 93-Y12P-086-CI
Partner: Fidelity Chemical Products Corporation

BACKGROUND

Electroless nickel plating is used on many products to improve corrosion resistance or to improve the adhesion of subsequently applied coatings. The plating is performed in a solution bath in which articles are immersed. Reaction products that act as poisons to the plating process build up in the bath and eventually inhibit any further plating from that solution. Current standard practice is to dispose of a spent solution as hazardous waste and replace it with newly prepared solution. Waste solutions are now known to contain carcinogenic materials. The ENVIRO-CP process selectively removes poisons (which are nonhazardous according to EPA regulations) from solutions, preventing the formation of hazardous wastes. The Lockheed Martin Energy Systems plating group has decades of experience in electroless nickel plating. The group conceived of, established the validity of, and patented the ENVIRO-CP process for plating bath rejuvenation, which eliminates the generation of hazardous waste from plating processes. Fidelity Chemical Products Corporation supplies chemicals to and has knowledge of the plating industry. A second partner (CRADA identity protected) conducts production plating.

DESCRIPTION

The objective of this Cooperative Research and Development Agreement (CRADA) project was to transfer the ENVIRO-CP process to the plating industry. Energy Systems personnel were to evaluate and modify the general process so that it could be used for a specific plating process, working in concert with the partner.

Technical results/accomplishments: The plating solutions and the ENVIRO-CP process were analyzed and modified for direct use in the partner's plating facility. An engineering flowsheet and pilot plant production-scale equipment were designed. Some pilot-scale equipment was fabricated; the balance will be procured and the system tested when the partner is able to budget for purchase of the remaining equipment.

ECONOMIC IMPACT

It is unclear when the ENVIRO-CP process will be implemented. The equipment procurement cost was significantly greater than envisioned in the original CRADA proposal. The plating partner's incentive focused on potential process improvements, which the ENVIRO-CP process would allow, to produce an advanced generation product. The CRADA work was suspended for lack of funds at the time when final plating bath and process testing were being conducted. As a consequence, the plating partner was not provided the results of final proof-of-process tests upon which to base further procurement and implementation of the process.

The industry and the country would benefit if the testing and acceptance had been consummated. No hazardous carcinogenic waste would have been generated from the process, which would have eliminated pressure (and additional cost) because of the nickel plater's state environmental protection regulations. Implementation of the ENVIRO-CP process also would have significantly improved the product quality and given the plater a competitive advantage in improved product quality and performance. This plater's products are used in the high-technology, fast-moving electronics/computer industry.
BENEFITS TO DOE

Several Defense Programs products are nickel-plated by the old, hazardous waste-generating process. Successful completion of this project would eliminate that area of hazardous waste generation by DOE. The quality of plating would be improved as well.

PROJECT STATUS

The DOE-funded portion of this CRADA was suspended for lack of funds. The project team is searching for further financial assistance to complete the project.

PROJECT EXAMPLES

The high-technology plated product examples could be provided when cleared by the CRADA-protected partner. A photograph is attached.

COMPANY SIZE

Fidelity Chemical Products Corporation has approximately 50 employees.

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RELEASE OF INFORMATION

Research funded by this cooperative agreement produced Protected CRADA Information (PCI) as documented in the CRADA's Final Report. This Project Accomplishment Summary, however, does not contain PCI and is approved for public release.
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