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Study of Metal Dusting Phenomenon and Development of Materials Resistant to Metal Dusting:

Annual Report

K. Natesan
Energy Technology Division

February 2002

Argonne National Laboratory, Argonne, Illinois 60439
operated by The University of Chicago
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Study of Metal Dusting Phenomenon and Development of Materials Resistant to Metal Dusting

ANNUAL REPORT
For the Period January to December 2001

Prepared by

K. Natesan
Energy Technology Division

February 2002

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Office of Industrial Technologies
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ABSTRACT

The deposition of carbon from cabonaceous gaseous environments is prevalent in many chemical and petrochemical processes such as reforming systems, syngas production systems, iron reduction plants, and others. One of the major consequences of carbon deposition is the degradation of structural materials by a phenomenon known as "metal dusting." There are two major issues of importance in metal dusting. First is formation of carbon and subsequent deposition of carbon on metallic materials. Second is the initiation of metal dusting degradation of the alloy. Details are presented on a research program that is underway at Argonne National Laboratory to study the metal dusting phenomenon from a fundamental scientific base involving laboratory research in simulated process conditions and field testing of materials in actual process environments. The project has participation from the U.S. chemical industry, alloy manufacturers, and the Materials Technology Institute, which serves the chemical process industry.

PROJECT DESCRIPTION

Project Title: Study of Metal Dusting Phenomenon and Development of Materials Resistant to Metal Dusting

Principal Investigators: Ken Natesan (Argonne National Laboratory)
Ken Baumert (Air Products and Chemicals Inc.)

ANL Participants in the Project: K. Natesan, Z. Zeng, W. K. Soppet, D. L. Rink, and V. Maroni

Organizations Participating in the Project:

- Materials Technology Institute
- Air Products and Chemicals Inc.
- ExxonMobil Chemical Company
- DuPont Chemical Company
- Allied Signal (part of Honeywell)
- Haynes International
- AvestaPolarit
- Sandvik Steel
- Duraloy Technologies
- Special Metals
- Krupp VDM
- Schmidt & Clemens
- Alon Surface Technologies
- MetalTek International
- Spectrum Metals
- Allegheny Ludlum