

QUARTERLY TECHNICAL PROGRESS REPORT
NUMBER 24

THE ECONOMICAL PRODUCTION OF
ALCOHOL FUELS FROM
COAL-DERIVED SYNTHESIS GAS

CONTRACT NO. DE-AC22-91PC91034

REPORTING PERIOD:

July 1, 1997 to September 30, 1997

SUBMITTED TO:

Document Control Center
U.S. Department of Energy
Pittsburgh Energy Technology Center
P.O. Box 10940, MS 921-118
Pittsburgh, PA 15236-0940

SUBMITTED BY:

West Virginia University Research Corporation
on behalf of West Virginia University
886 Chestnut Ridge Road
Morgantown, WV 26506

October, 1997

TABLE OF CONTENTS

Executive Summary	1
1.1 Introduction	2
1.2 Accomplishments, Results and Discussion	2
1.2.1 Laboratory Setup	2
1.2.2 Molybdenum-Based Catalyst Research	2
1.3 Conclusions and Recommendations	2
1.4 Future Plans	2

Executive Summary

Experimental work on this project is essentially over. We request a meeting with USDOE to consider plans to follow up the current work.

WVU will request a six month no-cost extension of the project.

The additional time is requested to allow for the submission of the Final Report by West Virginia University and review by the Department of Energy. In addition, Dr. Dady Dadyburjor and Dr. Edwin Kugler will attend the Annual Meeting of the AIChE in November 1997. Dr. Dadyburjor and Dr. Kugler will be presenting papers based upon work performed under the subject contract and assisting with technology transfer activities.

1.1 Introduction

The objective of Task 1 is to prepare and evaluate catalysts and to develop efficient reactor systems for the selective conversion of hydrogen-lean synthesis gas to alcohol fuel extenders and octane enhancers.

Task 1 is subdivided into three separate subtasks: laboratory and equipment setup; catalysis research; and reaction engineering and modeling. Research at West Virginia University (WVU) is focused on molybdenum-based catalysts for higher alcohol synthesis (HAS). Parallel research carried out at Union Carbide Corporation (UCC) is focused on transition-metal-oxide catalysts.

1.2 Accomplishments, Results and Discussion

1.2.1 Laboratory Setup

No major changes were necessary during this reporting period.

1.2.2 Molybdenum-Based Catalyst Research

We have finished the kinetic study and the data reduction on the reduced Mo-Ni-K/C catalyst. We carried out some preliminary temperature-programmed reduction (TPR) runs on a K-promoted copper-cobalt catalyst supported on alumina, brought over by a visitor, Dr. Sisir K. Roy, Deputy Director of the Central Fuel Research Institute, India. However, we could not analyze the curves meaningfully in the absence of information on the TPR of precursors of the complex catalyst. Two manuscripts are currently under preparation, and we are responding to reviewers' comments on a third manuscript..

1.3 Conclusions and Recommendations

The experimental work for this project is complete. We believe that the Mo-Ni-K/C catalyst, and the earlier-reported Co-Mo-K/C catalysts are promising catalysts for the synthesis of higher alcohols.

1.4 Future Plans

We request a meeting with USDOE to go over alternatives for research to follow up on some of our promising results. We request information from USDOE regarding the format of the final report.