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# **COAL PYROLYSIS**

# COAL SCIENCE AND TECHNOLOGY

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**COAL SCIENCE AND TECHNOLOGY 4**

# **COAL PYROLYSIS**

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## PREFACE

Prompted by the need of non-petroleum-based fuels, coal research has reemerged to center stage after a lengthy dormant period. Pyrolysis research, in particular, has gained considerable momentum because of its close connection to combustion, hydrolyrolysis and liquefaction. Spectroscopic and other instrumental techniques are currently producing prodigious information about coal structure and pyrolysis mechanisms, while modeling efforts are breaking new ground in sorting out chemical and physical phenomena to provide a fundamental although simplified description.

The continuing generation of experimental data will lead to revisions, in some cases drastic, of current structural and kinetic precepts. Yet, the postulates and assumptions of current work provide a meaningful starting point in elaborating theoretical descriptions of greater validity and applicability.

This monograph was written to organize recent results of pyrolysis research. Experimental and theoretical aspects, given approximately equal weight, are discussed in the light of basic chemical and physical mechanisms. With this orientation the monograph should be useful to chemists, engineers and graduate students with interests in coal research.

I would like to express my appreciation to the copyright holders for permission to reproduce various figures: to the American Institute of Chemical Engineers for Figs. 4.21, 5.7, 5.14; to the Combustion Institute for Figs. 4.3, 4.14, 4.15; to IPC Science and Technology Press, Ltd. for Figs. 4.16-4.18, 4.20, 5.1-5.6, 5.8, 5.9, 6.1, 6.6, 7.10-7.13; to Dr. W. R. Ladner for Figs. 7.6-7.9; to Dr. P. R. Solomon for Fig. 4.1; to Mr. M. Steinberg for Figs. 7.14-7.16 and to Dr. E. M. Suuberg for Figs. 5.10, 5.11, 6.2-6.5, 7.1-7.4.

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Pasadena, California  
April, 1982

G. R. GAVALAS

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