Coal Combustion and Conversion Technology

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Coal Combustion and Conversion Technology

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Stoke Orchard
Cheltenham*

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PREFACE

By the middle of the twentieth century, coal, although still the dominant world energy source, had come to be regarded as the product of a traditional industry nearing the end of its useful life-cycle. The prospect of cheap and plentiful energy supplies from oil and nuclear power promised to make the early decline of the coal industry inevitable. During the 1970s, however, attitudes changed dramatically. Oil price increases and doubts about the planned expansion of nuclear power led to a widespread recognition that coal had an important and long-term contribution to make. In parallel, there was a revival of interest in coal technology, particularly in methods of using coal with greater efficiency, environmental acceptability and versatility than previously.

This book is intended as a guide to coal utilisation technology, with the emphasis on new systems under development for the future, especially in the short and medium term. The traditional coal utilisation technologies are also discussed in the context of the future use of coal.

The book has been written for students, engineers, planners and policy makers with an interest in coal, rather than the specialist research worker. Inevitably, some scientific background is assumed, but a knowledge of coal utilisation technology is not required. Both the underlying scientific principles and engineering approaches are covered. However, recent developments in research programmes have been rapid, and no attempt is made to provide a complete catalogue of systems currently under investigation. Instead, engineering approaches are dealt with in terms of their general characteristics and classification so that the reader may be provided with a framework against which to assess specific schemes and future concepts.

The first two chapters discuss coal's position as a world energy source, and the historical background to the present technology and developments. The major technologies themselves, fluidised bed combustion, gasification and liquefaction, are considered in the next three chapters, followed by a further chapter describing other lines of technology under investigation. The last two chapters are devoted to the environmental and economic aspects of coal utilisation, respectively.

In general, SI units have been used throughout the book although, for convenience, pressures are expressed in bar and temperatures in °C.

In writing this book, I am indebted to a large number of colleagues at the Coal Research Establishment and other parts of the National Coal Board, including the Coal Utilisation Research Laboratories, Mining Research and Develop-

ment Establishment, the Economic Assessment Service of IEA Coal Research, Technical Information Branch and Operational Research Executive. I am extremely grateful for their help in providing information and in commenting on drafts. I would particularly like to thank those most closely involved: Mr J. Highley, Dr J. Holmes, Miss S. Lauder, Dr P. F. M. Paul and Mr. A. A. Randell.

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DAVID MERRICK