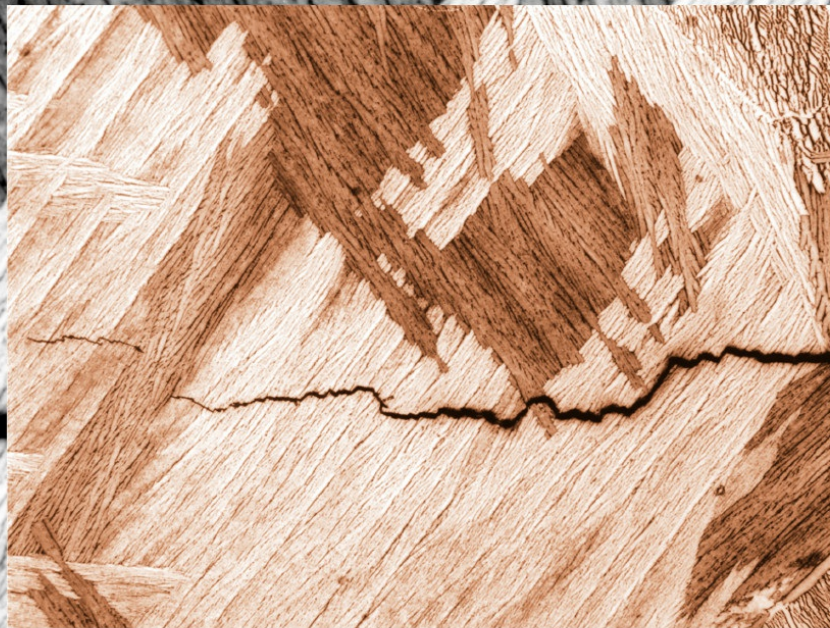


OILFIELD METALLURGY AND CORROSION FOURTH EDITION



By Bruce D. Craig

Preface

This book was written specifically on the subject of metallurgy in petroleum drilling and production. It is by no means comprehensive in its approach either to metallurgy or to petroleum drilling and production but the hope is to pass on some of the significant knowledge gained by the industry over the past 50 years that is being lost at an increasing rate when we can least afford such loss. In fact, a reader well versed in certain specialty areas of the industry will notice gaps that are unavoidable because of either the author's ignorance in the area or a lack of available information in the literature. The latter is quite frequent because many tools and processes are proprietary and therefore information is not readily available.

The purpose for continuing to update this book is threefold. First, there are many nonmetallurgists

in the petroleum industry who are responsible for materials selection and failure analysis, yet no single source is available for reference on the subject. Second, for the practicing metallurgist in the petroleum industry, no reference book contains many of the often-used tables, charts, graphs, etc., that are helpful in day-to-day decision making on materials. Third, the few knowledgeable people in this field continue to dwindle and it is hoped that this book will preserve some of the knowledge that has been gained over 50 years in the petroleum industry as it relates to materials.

Oilfield jargon for equipment and operations is used as often as possible to acquaint the reader with the proper nomenclature and to provide the experienced oilfield engineer with a familiar reference point. Where possible, actual examples from oilfield materials and failures are used to further assist the reader in understanding this discipline.

In the past, knowledge of oilfield metallurgy has been acquired by a combination of learning from experienced individuals in the field and by trial and error. This method of education, while effective, is quite time consuming and costly. The author hopes this book will reduce some of the front-end time of acquainting oneself with the fundamentals prior to becoming an effective materials engineer. This is particularly important at this stage in the history of the petroleum industry because the capabilities of alloys are being challenged in severe environments, and mistakes in application can be of tremendous economical consequence—not to mention the potential for loss of life.

Chapter One of this book is designed to give the reader a basic understanding of metallurgy and to aid in the discussion of metallurgy in subsequent chapters. Chapter Two introduces some of the major aspects of corrosion as they relate to the petroleum industry. Corrosion is an inseparable part of oilfield metallurgy, and the two will be linked throughout the book. While in some ways this may appear to be a corrosion book, it is not. Only metallurgical alternatives to problems are described, whereas other alternatives such as inhibitors, coatings, etc., exist that are not discussed but do enter in corrosion-control planning. Chapters Three, Four, Five, and Six describe the applications and behavior of alloys in various functions in the industry. Finally, Chapter Seven is a brief introduction to failure analysis, which is a very important part of oilfield metallurgy.

As in the first edition, the author would like to acknowledge those whose work is referenced in this book and the many friends in the industry who are not named but who have generously contributed to his education and understanding, not only of metallurgy but also of the field of petroleum engineering.

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