

Preface

This book was written as a summary of my long-standing interest in rare earth elements, which had started already when I was a master student at Utrecht University in the 1980s. Having begun seriously to tackle the topic early in 2009, it appeared that, during the so-called rare earth crisis from 2009 to approximately 2013, I was considered a kind of ‘sole expert’ in the Netherlands on rare earth element resources. This led me to being asked to give numerous presentations.

As a result of these many presentations, I realised that there was little or no information on the rare earth elements for the well-educated non-expert. So, in June 2014, after having given the umpteenth presentation on rare earth elements for an audience of members of the Groningen Department of the Royal Dutch Chemical Society (KNCV), I started with the preparations for writing this book.

This book is thus intended for the well-educated but non-expert reader, from any natural science discipline. This also explains the numerous footnotes scattered throughout the book, which are intended to elucidate the used terminology, or to supply short background information.

For the opportunity to write this book, I first of all would like to thank Dr. Mike Buxton, Head of the Resource Engineering Section, Delft University of Technology, who earnestly suggested me to write this work and allowed me to write it as part of my duties at Delft University. He also mentioned the importance of the South African Pilanesberg and Steenkampskraal deposits and supplied me with several papers and reports from the literature on these and other deposits.

Furthermore, this book could never have been written without the help and support of the following persons, companies, and institutions, which are listed here in alphabetical order:

- *Diana J. Bauer, Ph.D.*, US Dept. Of Energy, Director of the Office of Energy Policy Analysis and Integration Office of Energy Policy and Systems Analysis, for permission to use two images.
- *BeNature—The Green Living Channel*, USA for permission to use an image.
- *European Commission*, Directorate General for Internal Market, Industry, Entrepreneurship and SMEs for permission to use an image.

- *Anouk Borst M.Sc.* of the Geological Survey of Denmark and Greenland (GEUS), for supplying me with hard-to-get literature about the Illímaussaq Alkaline Complex, and the Igaliko Complex, South-West Greenland, and the REE deposits associated with them.
- *Dr. Denis Bykov*, Delft University of Technology, Reactor Institute Delft, for explaining the radioactivity of the element promethium (Pm).
- *Prof. dr.ir. Jan-Dirk Jansen*, Delft University of Technology, for introducing me to the Springer Briefs and supplying me with the contact at Springer Nature.
- *Mama's Minerals, Inc.*, Albuquerque and Santa Fe, New Mexico, USA, for permission to use an image.
- *Prof. Dr. Leo Kriegsman* and *Mrs. Arike Gill, M.Sc.*, of the Naturalis Biodiversity Centre at Leiden, the Netherlands, for supplying photographic images of rare earth minerals and rocks, for allowing me to make some photographs myself, and of course for permission to use all these images.
- *Peter and René van der Krogt*, from Delft, for permission to use their photographic images of the Ytterby mine.
- *Petra van Steenbergen* and *Hermine Vloemans*, my editorial partners at Springer Nature.
- *Dr. Phil Vardon*, Delft University of Technology, Department of Geosciences and Engineering, Section of Geo-Engineering, and an unknown reviewer for proofreading the chapters and correcting my sometimes Dutch-influenced English.
- *Dr. Yongxiang Yang*, Delft University of Technology, Department of Materials Science and Engineering, for supplying me with some literature on recycling of the rare earth elements.

Delft
October 2015

Jack Voncken

<http://www.springer.com/978-3-319-26807-1>

The Rare Earth Elements

An Introduction

Voncken, J.H.L.

2016, X, 127 p. 49 illus., 5 illus. in color., Softcover

ISBN: 978-3-319-26807-1