

Gmelin Handbook of Inorganic Chemistry

8th Edition

Sc, Y, La–Lu RARE EARTH ELEMENTS

C 9

Compounds with Se

With 233 illustrations

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System Number 39



Springer-Verlag · Berlin · Heidelberg · New York · Tokyo 1986

LITERATURE CLOSING DATE: 1984
IN MANY CASES MORE RECENT DATA HAVE BEEN CONSIDERED

Library of Congress Catalog Card Number: Agr 25-1383

ISBN 3-540-93525-8 Springer-Verlag, Berlin · Heidelberg · New York · Tokyo

ISBN 0-387-93525-8 Springer-Verlag, New York · Heidelberg · Berlin · Tokyo

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Printed in Germany

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Typesetting, printing, and bookbinding: LN-Druck Lübeck

Gmelin Handbook of Inorganic Chemistry

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Volumes published on "Rare Earth Elements" (Syst. No. 39)

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* Completely or ° partly in English

Gmelin Handbook of Inorganic Chemistry

8th Edition

Gmelin Handbuch der Anorganischen Chemie

Achte, völlig neu bearbeitete Auflage

Prepared
and issued by

Gmelin-Institut für Anorganische Chemie
der Max-Planck-Gesellschaft
zur Förderung der Wissenschaften
Director: Ekkehard Fluck

Founded by
8th Edition

Leopold Gmelin
8th Edition begun under the auspices of the
Deutsche Chemische Gesellschaft by R. J. Meyer

Continued by

E. H. E. Pietsch and A. Kotowski, and by
Margot Becke-Goehring



Springer-Verlag Berlin · Heidelberg · New York · Tokyo 1986

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Preface

The volume "Rare Earth Elements" C 9 deals with the rare earth selenides, oxide selenides, selenites, and selenates, as well as the associated alkali double compounds, diselenate nitrates, and the selenide halides. So far as meaningful and as in all earlier volumes of "Rare Earth Elements" Series C ("Seltenerdelemente" Reihe C), comparative data are presented in sections preceding treatment of the individual compounds and systems.

Gaseous and matrix-isolated selenide molecules are described in the first section. The subsequent sections deal mainly with the chemical and physical properties of solid selenides of which EuSe and TmSe play the most important role. EuSe reveals a very complex magnetic behavior, the extent of which is not settled even now, despite extensive magnetic investigations and additional physical studies like Raman effect, nuclear magnetic resonance, and modulated optical spectra. The valency of TmSe can be controlled under ambient conditions by adjusting the stoichiometry or by alloying with other rare earth monoselenides. The valency changes in the homogeneity region from purely trivalent Tm on the Se-rich phase boundary near $\text{Tm}_{0.87}\text{Se}$ to an intermediate valence state for nearly stoichiometric TmSe. A shift in the direction of the divalent state can be reached by alloying with EuSe. Much experimental work has been done to understand the behavior of TmSe, but even now many questions are still open. The theoretical models are similar to those for the pressure-induced intermediate valence state of SmS, reviewed in "Rare Earth Elements" C 7.

The most extensively studied oxide selenides belong to the $\text{M}_2\text{O}_2\text{Se}$ type; data on preparation and crystallographic properties dominate this section. Main topics of the sections on selenites, selenates, and associated alkali double compounds are the preparation of the compounds and their thermal decomposition. The selenide halides, especially the selenide fluorides of the type MSeF , show very interesting crystallographic properties. Main topics of this section are the polytypes of YSeF.

Frankfurt am Main
November 1985

Hartmut Bergmann

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