# The Chemistry and Technology of GYPSUM

R. A. Kuntze, editor

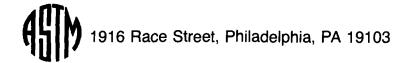


# THE CHEMISTRY AND TECHNOLOGY OF GYPSUM

A symposium sponsored by ASTM Committee C-11 on Gypsum and Related Building Materials and Systems Atlanta, GA, 14–15 April 1983

ASTM SPECIAL TECHNICAL PUBLICATION 861 Richard A. Kuntze, Ontario Research Foundation, editor

ASTM Publication Code Number (PCN) 04-861000-07



#### Library of Congress Cataloging in Publication Data

The Chemistry and technology of gypsum.

(ASTM special technical publication; 861) "ASTM publication code number (PCN) 04-861000-07." Includes bibliographies and index.

1. Gypsum—Congresses. I. Kuntze, Richard A. II. ASTM Committee C-11 on Gypsum and Related Building Materials and Systems. III. Series. TA455.G9C48 1984 666'.92 84-70880 ISBN 0-8031-0219-4

Copyright © by AMERICAN SOCIETY FOR TESTING AND MATERIALS 1984 Library of Congress Catalog Card Number: 84-70880

#### NOTE

The Society is not responsible, as a body, for the statements and opinions advanced in this publication.

Printed in Ann Arbor, MI September 1984

#### **Foreword**

The symposium on The Chemistry and Technology of Gypsum and Gypsum Products was presented at Atlanta, GA, 14–15 April 1983. The symposium was sponsored by ASTM Committee C-11 on Gypsum and Related Building Materials and Systems. Richard A. Kuntze, Ontario Research Foundation, presided as chairman of the symposium and is editor of the publication.

## Related ASTM Publications

Masonry: Materials, Properties, and Performance, STP 778 (1982), 04-778000-07

Extending Aggregate Resources, STP 774 (1982), 04-774000-08

Cement Standards—Evolution and Trends, STP 663 (1979), 04-663000-07

Significance of Tests and Properties of Concrete and Concrete-Making Materials, STP 169B (1978), 04-169020-07

### A Note of Appreciation to Reviewers

The quality of the papers that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

ASTM Committee on Publications

#### **ASTM Editorial Staff**

Janet R. Schroeder Kathleen A. Greene Rosemary Horstman Helen M. Hoersch Helen P. Mahy Allan S. Kleinberg Susan L. Gebremedhin

#### Contents

Introduction	1
Physical Testing of Gypsum Board Per ASTM C 473— ROBERT F. ACKER	3
Gypsum Analysis with the Polarizing Microscope—  GEORGE W. GREEN	22
The Effect of Sorbed Water on the Determination of Phase Composition of CaSO <sub>4</sub> · H <sub>2</sub> O Systems by Various Methods—Danica H. Turk and Larbi Bounini	48
A Simple Apparatus for Measurement of the Hydration Ratio of Plasters and Plaster Rocks—ETIENNE KARMAZSIN	57
<b>Determination of Sulfur Trioxide in Gypsum—</b> S. GOSWAMI AND D. CHANDRA	67
Rapid Multielement Analysis of Gypsum and Gypsum Products by X-Ray Fluorescence Spectroscopy—VLADIMIR KOCMAN	72
The Relationship Between Water Demand and Particle Size Distribution of Stucco—Lydia M. Luckevich and Richard A. Kuntze	84
Retardation of Gypsum Plasters with Citric Acid: Mechanism and Properties—THOMAS KOSLOWSKI AND UDO LUDWIG	97
Byproduct Gypsum—JEAN W. PRESSLER	105
Assessment of Environmental Impacts Associated with Phosphogypsum in Florida—ALEXANDER MAY AND JOHN W. SWEENEY	116

Evaluation of Radium and Toxic Element Leaching Characteristics of Florida Phosphogypsum Stockpiles—ALEXANDER MAY	
AND JOHN W. SWEENEY	140
Drying and Agglomeration of Flue Gas Gypsum—FRANZ	
WIRSCHING	160
Summary	173
Index	177