

SYMPOSIUM ON EXCHANGE PHENOMENA IN SOILS

Presented at the
FIFTY-FIFTH ANNUAL MEETING
(FIFTIETH ANNIVERSARY MEETING)
AMERICAN SOCIETY FOR TESTING MATERIALS
New York, N. Y., June 27, 1952



ASTM Special Publication No. 142
FIFTIETH ANNIVERSARY PUBLICATION

Published by the
AMERICAN SOCIETY FOR TESTING MATERIALS
1916 Race St., Philadelphia 3, Pa.

SYMPOSIUM ON EXCHANGE PHENOMENA IN SOILS

Presented at the
FIFTY-FIFTH ANNUAL MEETING
(FIFTIETH ANNIVERSARY MEETING)
AMERICAN SOCIETY FOR TESTING MATERIALS
New York, N. Y., June 27, 1952



Reg. U. S. Pat. Off.

ASTM Special Technical Publication No. 142
FIFTIETH ANNIVERSARY PUBLICATION

Published by the
AMERICAN SOCIETY FOR TESTING MATERIALS
1916 Race St., Philadelphia 3, Pa.

**COPYRIGHT, 1953
By THE
AMERICAN SOCIETY FOR TESTING MATERIALS**

**Printed in Baltimore, Md.
April, 1953**

FOREWORD

The papers and discussions in this Symposium on Exchange Phenomena of Soils were presented at the Thirty-fourth Session of the Fifty-fifth Annual Meeting of the American Society for Testing Materials held in New York, N. Y., June 27, 1952.

This Symposium was sponsored by Subcommittee R-6 on Physico-Chemical Properties of Soils of Committee D-18 on Soils for Engineering Purposes and was presided over by Mr. Richard C. Mielenz, Head, Petrographic Laboratory, U. S. Bureau Reclamation, Denver, Colo.

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

CONTENTS

	PAGE
Introduction—Richard C. Mielenz.....	1
Ion Exchange in Relation to Some Properties of Soil-Water Systems—Ralph E. Grim..	3
Discussion.....	9
Cation Exchange [Capacity of Losses and Its Relation to Engineering Properties— Donald T. Davidson and John B. Sheeler.....	10
Job Experience with Exchange Phenomena Involving Inorganic and Organic Ions— Hans F. Winterkorn.....	29
Surface Chemical Properties of Clay Minerals and Soils from Theoretical and Experi- mental Developments in Electroosmosis—Hans F. Winterkorn.....	44
Some Effects of Treating Expansive Clays with Calcium Hydroxide—Irving Goldberg and Alexander Klein.....	53
Discussion.....	67
Summary—Edmund F. Preece.....	72

THIS PUBLICATION is one of many issued by the American Society for Testing Materials in connection with its work of promoting knowledge of the properties of materials and developing standard specifications and tests for materials. Over the years the Society has published many technical symposiums, reports, and special books. These may consist of a series of technical papers, reports by the A.S.T.M. technical committees, or compilations of data developed in special Society groups with many organizations co-operating. A list of A.S.T.M. publications and information on the work of the Society will be furnished on request.

THIS PUBLICATION is one of many issued by the American Society for Testing Materials in connection with its work of promoting knowledge of the properties of materials and developing standard specifications and tests for materials. Over the years the Society has published many technical symposiums, reports, and special books. These may consist of a series of technical papers, reports by the A.S.T.M. technical committees, or compilations of data developed in special Society groups with many organizations co-operating. A list of A.S.T.M. publications and information on the work of the Society will be furnished on request.