AICHE JOURNAL MAY 1980 • VOL. 26, NO. 3

The AIChE Journal, a publication of the American Institute of Chemical Engineers, is devoted to fundamental research and developments having immediate or potential value in chemical engineering.

PUBLISHER

J. C. Forman

PUBLICATIONS DIRECTOR Larry Resen

EDITOR

Robert H. Kadlec

TECHNICAL EDITOR Haeja L. Han

PRODUCTION EDITOR Maura Mullen

EDITORIAL ASSISTANT Barbara T. Lynn

EDITORIAL BOARD R. Dale Biggs K. C. Chao James M. Douglas George R. Gavalas L. Louis Hegedus Maurice A. Larson Dan Luss Daniel D. Perlmutter Joseph A. Polack W. Ř. Schowalter Kenneth A. Smith Stephen Whitaker

Publication Office, 215 Canal Street, Manchester, New Hampshire, Published in January, March, May, July, September, and November by the American Institute of Chemical Engineers, 345 East 47 Street, New York, New York 10017. (ISSN 0001-1541) Manuscripts should be submitted to Robert H. Kadlec, Editorial Offices, Room 3036, East Engineering Building, The University of Michigan, Ann Arbor, Michigan 48109. Statements and opinions in the AICAE Journal are those of the contributors, and the American Institute of Chemical Engineers assumes no responsibility for them. Subscription: one year, \$70; special member rate, \$12; additional yearly postage, Canada \$4.00, Pan American Union \$5.00, other foreign \$5.00 (foreign subscriptions payable in advance). Single copies: \$16.50. Single copies more than one year old: \$17.50. Second-class postage paid at New York, N. Y. and additional mailing offices. Copyright 1980 by the American Institute of Chemical Engineers. National headquarters of AIChE is concerned about nondelivery of copies of the AIChE Journal and urgently requests subscribers to give prompt notification of any change of address. Sixty days must be allowed for changes to be made in the records. Publication Office, 215 Canal Street, Manches-

Postmaster: Please send form 3579 to AIChE Journal, 345 East 47 Street, New York, N. Y. 10017.

AIChE Symposium Series

Recent Studies

S-196. Implications of the Clean Air Amendments of 1977 and of Energy Considerations for Air Pollution Control. The work presented in this volume consists of papers dealing with the implications of the Clean Air Amendments of 1977 interwined with the continuing debate on energy versus environment.

1980. 394 pp. AIChE members \$10; nonmembers \$22.

S-197. Water—1979. The papers in this volume deal with priority pollutants, treatment with activated carbon, ozonization and cooling water treatment, and energy's need for water.

1980. 388 pp. AIChE members \$15; nonmembers \$30.

S-198. Fundamentals and Applications of Solar Energy. This volume covers a wide range of fundamental and applied research including collector technology, thermal storage, solar cooling, electrical power generation, photovoltaic systems, fuel and chemicals production, biomass utilization, and solar heat pumping systems.

1980. 172 pp. AIChE members \$12.50; nonmembers \$25.

Order from American Institute of Chemical Engineers, 345 East 47 Street, New York, New York 10017.

ASK FOR THE AICHE PUBLICATIONS CATALOG.

Reproducing copies

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that for a stated fee copies of the article may be made for personal or internal use of specific clients. This consent is given on the condition that the copier pay the per-copy fee (appearing as part of the code) through the Copyright Clearance Center, Inc., P. O. Box 765, Schenectady, N.Y. 12301, for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to copyring for general distribution, for advertising or promotional purposes, for inclusion in a publication, or for resale.

Articles published before 1978 are subject to the same copyright conditions, except that the fee is 75 cents for each article.