Emulsions – A Fundamental and Practical Approach

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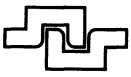

Series C: Mathematical and Physical Sciences - Vol. 363

Emulsions – A Fundamental and Practical Approach

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Springer-Science+Business Media, B.V.

Proceedings of the NATO Advanced Research Workshop on
Emulsions – A Fundamental and Practical Approach
Bergen, Norway
June 24–25, 1991

Library of Congress Cataloging-in-Publication Data

NATO Advanced Research Workshop on "Emulsions--a Fundamental and Practical Approach" (1991 : Bergen, Norway)
Emulsions--a fundamental and practical approach : proceedings of the NATO Advanced Research Workshop on "Emulsions--a Fundamental and Practical Approach", held in Bergen, Norway, June 24-25, 1991 / edited by Johan Sjöblom.
p. cm. -- (NATO ASI series. Series C, Mathematical and physical sciences ; vol. 363)
"Published in cooperation with NATO Scientific Affairs Division."
Includes bibliographical references and index.
ISBN 978-94-010-5085-2 ISBN 978-94-011-2460-7 (eBook)
DOI 10.1007/978-94-011-2460-7
1. Emulsions--Congresses. I. Sjöblom, Johan, 1953- .
II. North Atlantic Treaty Organization. Scientific Affairs Division. III. Title. IV. Series: NATO ASI series. Series C, Mathematical and physical sciences ; no. 363.
TP156.E6N37 1991
660'.294514--dc20 91-47207

ISBN 978-94-010-5085-2

Originally published by Kluwer Academic Publishers in 1992
Softcover reprint of the hardcover 1st edition 1992

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PREFACE

To control stability of an emulsified system is to control fundamental processes like sedimentation (or creaming), flocculation, coalescence and Ostwald ripening. In these processes, a knowledge of fundamental physico-chemical properties of stabilizers, (surfactants or polymers) either as monomers or in an aggregated form is required. During the NATO ARW on "Emulsions - A Fundamental and Practical Approach" organized on June, 24. and 25. 1991 in Bergen, Norway, attention was focussed on emulsions from both theoretical and practical aspects. The workshop gathered 95 participants from 14 different countries.

The lectures at the workshop covered from a fundamental point of view general aspects on stability, interfacial adsorption mechanisms, interfacial rheology, direct measurements of surface forces and bulk rheological properties of emulsions, and self-diffusion properties as measured by means of NMR. With regard to applications the fields of food, crude oil and pharmaceutical emulsions were covered.

For the food emulsions a central topic is the role of the proteins at the W/O interface, their conformations and mechanisms by which they can be replaced at the interface (competitive adsorption).

For water-in-crude oil emulsions the mechanisms behind the resolution of water are of large technical importance. Characterizations of the stabilizing asphaltene fraction, physico-chemical properties of destabilizing surfactants and the interplay between asphaltenes and waxes at the W/O interface were discussed.

Stuctures of pharmaceutical emulsions and creams were characterized as well as nonionic vesicle drug administration systems. In addition fluorocarbon emulsions acting as blood substitutes were also presented.

In the poster session a large variety of topics was covered. Stability mechanisms were viewed from Langmuir monolyer studies of xanthan polymers as well as interfacially active crude oil components, from interfacial pressure studies, from equilibrium phase diagrams, from dielectric spectroscopy measurements of the stabilizing interfacial membrane, from depletion interaction and from electrolyte effect on highly concentrated water-in-oil emulsions. Technical systems presented included fluorocarbon emulsions as blood substitutes, commercial intravenous emulsions, margarines and tablespreads, crude oil emulsions, emulsion polymerization and alkyd emulsions.

The workshop was financed by NATO Scientific Affairs Division (Brussels), by the companies Berol Nobel Ab (Stenungsund, Sweden), Houm A/S (Oslo, Noway), KSV Instruments Ltd (Helsinki, Finland), Norsk Hydro A/S (Bergen, Norway) and Statoil A/S (Stavanger, Norway). Following associations also contributed: The Norwegian Research Council for Science and The Humanities (NAVF, Oslo, Norway), VISTA (Oslo, Norway) and International

Association for Colloid and Interface Scientists (IACIS).
Locally support was obtained from University of Bergen.

To all the lecturers, participants and sponsors - THANK YOU for your contributions in making the NATO ARW a successful workshop.

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