

Polymer Nanocomposites

Polymer Nanocomposites

Edited by
Devesh K. Misra

Symposium Sponsored by
TMS (The Minerals, Metals & Materials Society)

Held during the
TMS 2006 Annual Meeting in
San Antonio, Texas, USA
March 12-16, 2006

A Publication of
TMS

A Publication of **TMS (The Minerals, Metals & Materials Society)**
184 Thorn Hill Road
Warrendale, Pennsylvania 15086-7528
(724) 776-9000

Visit the TMS web site at
<http://www.tms.org>

Statements of fact and opinion are the responsibility of the authors alone and do not imply an opinion on the part of the officers, staff, or members of TMS, The Minerals, Metals, and Materials Society. TMS assumes no responsibility for the statements and opinions advanced by the contributors to its publications or by the speakers at its programs. Registered names and trademarks, etc., used in this publication, even without specific indication thereof, are not be considered unprotected by the law.

No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording, or otherwise, without written permission from the publisher.

Printed in the United States of America
Library of Congress 2006920381
ISBN: 978-0-87339-623-3

Authorization to photocopy for internal or personal use beyond the limits of Sections 107 and 108 of the U.S. Copyright Law is granted by TMS, provided that the base fee of \$7.00 per copy is paid directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923 USA, www.copyright.com. Prior to photocopying items for educational classroom use, please contact the Copyright Clearance Center, Inc.

For those organizations that have been granted a photocopy license by the Copyright Clearance Center, a separate system of payment has been arranged.

This consent does not extend to copying items for general distribution or for advertising or promotional purposes or to republishing items whole or in part in any work in any format.

Please direct republication or special copying permission requests to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923 USA; (978) 750-8400; www.copyright.com.

If you are interested in purchasing a copy of this book, or if you would like to receive the latest TMS publications catalog, please telephone (800) 759-4867 (U.S. only) or (724) 776-9000, EXT. 270.

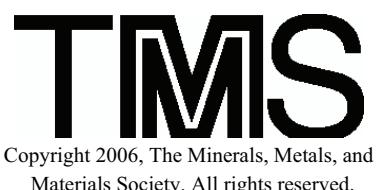


Table of Contents

Session I

Limitations of Mechanical Improvement for High-Stiffness Polymers Layered-Inorganic Nanocomposites.....	3
<i>E. Manias, G. Polizos, and M.J. Heidecker</i>	
Effect of Stylus Type on the Scratch Resistance of Polymer Composites	11
<i>Q. Yuan, R.R. Thridandapani, L. Surampudi, and R.D.K. Misra</i>	
Hierarchical Structure, Properties, and Scratch Resistance of Melt Intercalated Polymer-Clay Nanocomposites	21
<i>A. Mudaliar, R.R. Thridandapani, Q. Yuan, and R.D.K. Misra</i>	
Advanced Nanoparticle-Reinforced Polymer Composite Materials in Air-Blast Vibration Damping Protection.....	31
<i>M.V. Kireitseu, G.R. Tomlinson, J.A. Rongong, J. Lu, and R.A. Williams</i>	
Effects of Filler and Temperature on the Stability of B-Crystal in Glass Bead Filled Polypropylene.....	41
<i>Q. Yuan, W. Jiang, L. An, and R.D.K. Misra</i>	

Session II

Photocatalytic and Antimicrobial Active Polymer Nanocomposites Membrane for Water Purification.....	53
<i>S. Rana, J. Rawat, M.M. Sorensson, and R.D.K. Misra</i>	
Micromechanism of Stress Whitening During Tensile Deformation in Polymer Nanocomposites	63
<i>R.R. Thridandapani, H. Nathani, J.P. Jog, and R.D.K. Misra</i>	
The Relaxation and Crystallization Behavior of Polymer Nanocomposites	73
<i>Q. Yuan, S. Awate, and R.D.K. Misra</i>	
Impact Strength of Clay Reinforced High Density Polyethylene Nanocomposites	83
<i>M. Tanniru, R.R. Thridandapani, S. Awate, Q. Yuan, and R.D.K. Misra</i>	
Author Index	93
Subject Index	95

Author Index

A

An, L., 41
Awate, S., 73, 83

H

Heidecker, M.J., 3

J

Jiang, W., 41
Jog, J.P., 63

K

Kireitseu, M.V., 31

L

Lu, J., 31

M

Manias, E., 3
Misra, R.D.K., 11, 21, 41, 53, 63, 73, 83
Mudaliar, A., 21

N

Nathani, H., 63

P

Polizos, G., 3

R

Rana, S., 53
Rawat, J., 53
Rongong, J.A., 31

S

Sorensson, M.M., 53
Surampudi, L., 11

T

Tanniru, M., 83
Thridandapani, R.R., 11, 21, 63, 83
Tomlinson, G.R., 31

W

Williams, R.A., 31

Y

Yuan, Q., 11, 21, 41, 73, 83

Subject Index

β-Crystal, 41

A

Antimicrobial Function, 53

C

Clay, 63

Crystallization, 73

Crystallization Temperature, 41

D

Damping, 31

Dynamics, 31

G

Glass Bead, 41

I

Interfacial Adhesion, 3

Interfacial Strength, 3

M

Mechanics, 31

Metal Cations Trapping, 53

Microstructure, 11, 63, 83

N

Nanoclay, 21, 73

Nanocomposites, 63

Nanoparticle Reinforcement, 31

P

Plastic Deformation, 11, 83

Polymer Composites, 11, 83

Polymer Nanocomposites, 3

Polypropylene, 21, 41, 73

Porous Membrane, 53

S

Stress Whitening, 63

Stylus, 11

Surface Deformation, 21

T

Tensile Straining, 63

V

Viscoelastic Polymer, 31

W

Water Purifications, 53