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978-1-107-40888-3 - Materials Research Society Symposium Proceedings: Volume 890:

Surface Engineering for Manufacturing Applications

Editors: Steve J. Bull, Paul R. Chalker, ShaoChen Chen, Wen Jin Meng and Roya Maboudian

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**MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 890**

Surface Engineering for Manufacturing Applications

Symposium held November 28–December 1, 2005, Boston, Massachusetts, U.S.A.

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Materials Research Society
Warrendale, Pennsylvania

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Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press

32 Avenue of the Americas, New York NY 10013-2473, USA

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org

Information on this title: www.cambridge.org/9781107408883

Materials Research Society

506 Keystone Drive, Warrendale, PA 15086

<http://www.mrs.org>

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First published 2006

First paperback edition 2012

Single article reprints from this publication are available through
University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, MI 48106

CODEN: MRSPDH

ISBN 978-1-107-40888-3 Paperback

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PREFACE

Surface interactions and surface modifications have become increasingly critical for a broad range of manufacturing technologies. Applications can be found not only in the traditional manufacturing sectors, but also in manufacturing processes for microelectronics, optics, and other emerging industries such as micro-/nano- electro-mechanical-systems (MEMS/NEMS). Many applications demand engineered surfaces at different length scales that will function under extreme conditions.

The span of papers included within this proceedings from Symposium Y, "Surface Engineering for Manufacturing Applications," held November 28–December 1 at the 2005 MRS Fall Meeting in Boston, Massachusetts, testifies to the growing importance of controlling surface interactions and engineering surface properties in modern manufacturing processes. In the field of tribological coatings, the increasing sophistication of coating processes to provide control over materials and composition gradients is being exploited to tailor properties such as adhesion, stresses, thermal barrier and wear resistance. Understanding of the influence of nanostructure in coatings, either in the form of super-lattices or nano-composites has become pivotal in the development of hard and wear-resistant materials.

Modeling and simulation continue to make more sophisticated contributions to the understanding and predication of surface properties and surface interactions. Recent advances in this field have particularly focused on the microstructure and organization of organic thin films. In tribology, the combination of modeling with experimental probe techniques is increasing our understanding of erosion and wear mechanisms.

Lastly, the editors would like to acknowledge the financial support for this symposium received from Epichem Group UK and Timken Research.

Steve J. Bull
Paul R. Chalker
ShaoChen Chen
Wen Jin Meng
Roya Maboudian

February 2006

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