



JOURNAL OF RESEARCH

Association of Textile, Apparel & Materials Professionals

Editor in Chief

Martin J. Bide, The University of Rhode Island

Associate Editors

Ozgur Atalay, Harvard University

Jiangning Che, California State Polytechnic University

A. N. Desai, Bombay Textile Research Association (BTRA)

Sabyasachi Gaan, EMPA

Dawood Hussain, NED University

Calvin YM Lam, Intertek Testing Services Hong Kong Ltd.

Seungsin Lee, Yonsei University

Roshan Paul, Indo-German Science & Technology Centre

Seshadri S. Ramkumar, Texas Tech University

Narendra Reddy, Centre for Emerging Technologies, Jain University

Ajoy Sarkar, Fashion Institute of Technology

Gang Sun, University of California, Davis

Jiping Wang, Zhejiang Sci-Tech (ZSTU) University

Yiqi Yang, University of Nebraska, Lincoln

Min Zhu, Fashion Institute of Technology

Editorial Advisory Board

Fred Cook, Georgia Institute of Technology

A. Blanton Godfrey, North Carolina State University

Ian Hardin, University of Georgia

Majid Sarmadi, University of Wisconsin-Madison

AATCC Officers

President: **Rembert "Bert" Truesdale III**, TenCate Protective Fabrics

President-Elect: **Kerry King**, Spoonflower Inc.

Immediate Past-President: **Sandra Johnson**, Color Solutions International

Treasurer: **Warren Perkins**

AATCC Journal of Research Staff

Jack Y. Daniels, Publisher/Executive Vice President

Maria C. Thiry, Publications Director

Ann Holland, Acquisitions Editor

J. Michael Quante, Science Editor/Webmaster

Bliss Coleman, Design, Production, & Circulation

Subscriptions

www.aatcc.org/pub/subscribe

Email: colemanb@aatcc.org

Phone: +1.919.549.3543

Fax: +1.919.549.8933

AATCC members: free with membership

Institutional Subscribers

Electronic subscriptions only: includes subscriptions to both electronic publications *AATCC Journal of Research* and *AATCC Review*

Publish with us

www.aatcc.org/pub/publish

Email: hollanda@aatcc.org

Fax: +1.919.549.8933

AATCC | 1 Davis Drive | PO Box 12215

Research Triangle Park, NC 27709-2215 | USA

AATCC Journal of Research is published bimonthly in electronic format.

Permissions

Copyright for *AATCC Journal of Research* is owned by AATCC, unless otherwise noted. To copy or distribute beyond the fair use provisions of the US Copyright Act, contact Copyright Clearance Center Inc. (www.copyright.com). Specify ISSN 2330-5517. Authors, visit www.aatcc.org/pub/get-permission.

Mention of any trade name or proprietary product in *AATCC Journal of Research* does not constitute a guarantee or warranty of the product by the AATCC and does not imply its approval to the exclusion of other products that may also be suitable.

AATCC Journal of Research (Online ISSN 2330-5517)

© 2017, American Association of Textile Chemists and Colorists