MRS Bulletin

CELEBRATING 45 YEARS

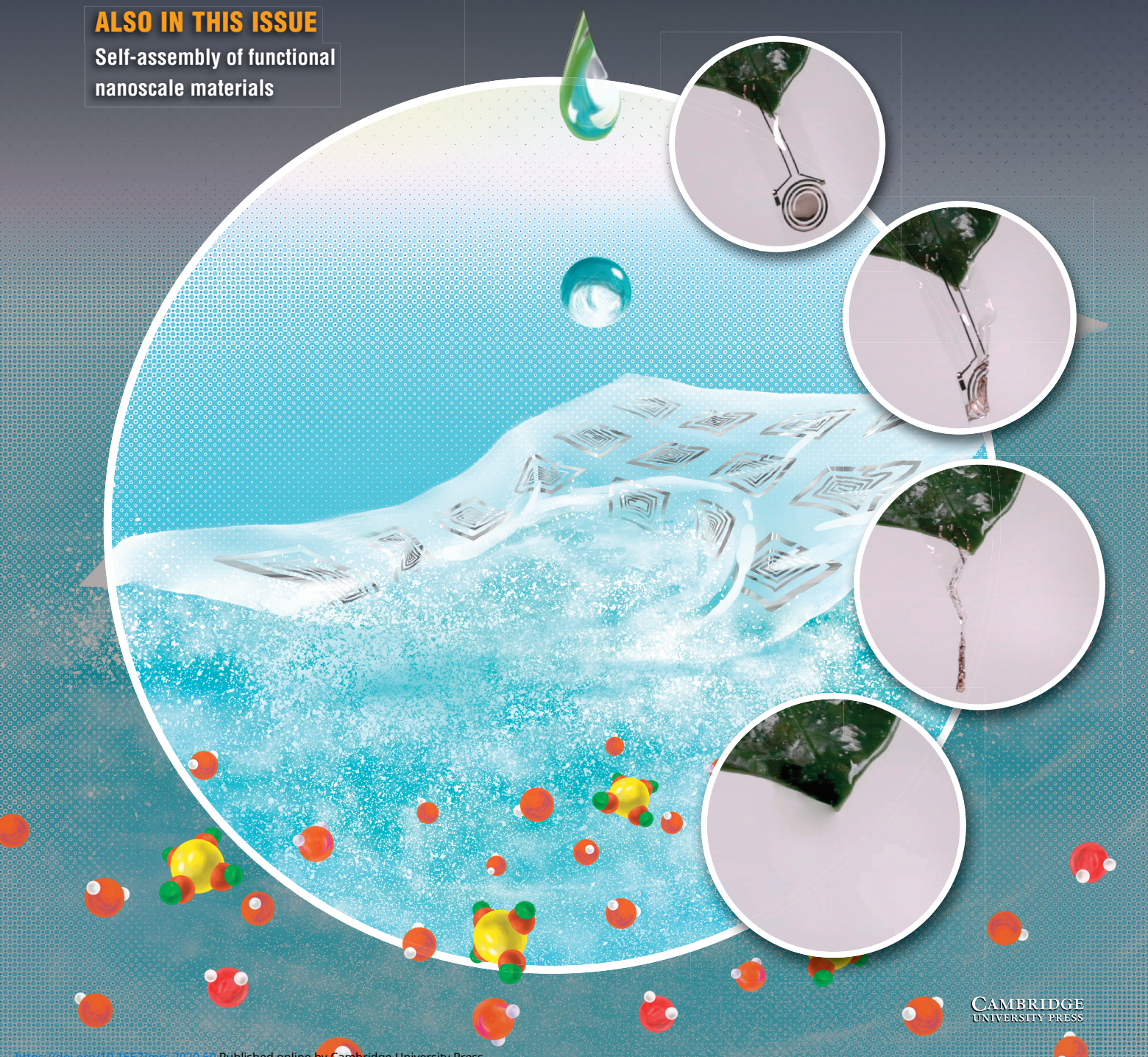
MRS MATERIALS RESEARCH SOCIETY®
Advancing materials. Improving the quality of life.

February 2020 Vol. 45 No. 2
mrs.org/bulletin

Transient electronic devices

ALSO IN THIS ISSUE

Self-assembly of functional nanoscale materials



CAMBRIDGE UNIVERSITY PRESS

https://doi.org/10.1557/mrs.2020.60 Published online by Cambridge University Press

https://doi.org/10.1557/mrs.2020.60 Published online by Cambridge University Press

https://doi.org/10.1557/mrs.2020.60 Published online by Cambridge University Press

MRS Bulletin
FEBRUARY 2020 VOLUME 45 Number 2 ISSN: 0883-7694 CODEN: MRSBEA

CONTENTS

TRANSIENT ELECTRONIC DEVICES

TECHNICAL FEATURE

ON THE COVER

Transient electronic devices. Transient electronics, that can disappear, dissolve, or degrade in a controlled manner over time, has been attracting significant attention as a new and emerging technology. Transient electronics has unique applications, such as bioresorbable medical devices that can provide short-/medium-term diagnosis and treatment without removal surgery, environmentally friendly devices that can physically decompose and produce no waste, and self-destructing devices that can provide nonrecoverable IT and military security systems. This issue of *MRS Bulletin* highlights recent progress in transient electronics, focusing on materials aspects, including characterization, fabrication, and applications. The cover shows the dissolution of a transient electronic device comprising an inorganic Si nanomembrane, a Mg electrode, and a SiO_2 dielectric formed on a biodegradable polymer, such as silk, poly(lactic-*co*-glycolic acid) (PLGA), or poly(D,L-lactic acid) (PLA). All materials used for transient electronics are fully degradable into the small molecular scale, and their byproducts are biocompatible and environmentally benign. The inset images demonstrate how a transient electronic device can fully dissolve over time. Main image courtesy of S.-K. Kang, Seoul National University. Inset images courtesy of J. Koo, Northwestern University. See the technical theme that begins on p. **87**.

COMING IN MARCH 2020
Metasurfaces for flat optics

https://doi.org/10.1557/mrs.2020.60 Published online by Cambridge University Press

DEPARTMENTS

OPINION

NEWS & ANALYSIS

SOCIETY NEWS

FEATURES

CAREER CENTRAL

ADVERTISERS IN THIS ISSUE Page No.

connect

mrs.org/bulletin
mrs.org/energy-quarterly
mrs.org/mymrs
journals.cambridge.org
mrs.org/bulletin-podcast
@mrsbulletin

https://doi.org/10.1557/mrs.2020.60 Published online by Cambridge University Press

MRS MATERIALS RESEARCH SOCIETY®
Advancing materials. Improving the quality of life.

MRS Bulletin

EDITORIAL OFFICE 506 Keystone Drive, Warrendale, PA 15086-7573 USA
Bulletin@mrs.org tel 724.779.2747 fax 724.779.8313 mrs.org

About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973 and headquartered in Warrendale, Pennsylvania, USA, promotes interdisciplinary materials research. Today, MRS is a growing, vibrant, member-driven organization of over 16,000 materials researchers spanning over 80 countries, from academia, industry, and government, and a recognized leader in the advancement of interdisciplinary materials research.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across many scientific and technical fields touching materials development. MRS conducts three major international annual meetings and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction through University Chapters. In the international arena, MRS implements bilateral projects with partner organizations to benefit the worldwide materials community. The Materials Research Society Foundation helps the Society advance its mission by supporting various projects and initiatives.

MRS Bulletin (ISSN: 0883-7694, print; ISSN 1938-1425, online) is published monthly by the Materials Research Society, 506 Keystone Drive, Warrendale, PA 15086-7573. Periodical postage paid at New York, NY, and at additional mailing offices. POSTMASTER: Send address changes to *MRS Bulletin* in care of the Journals Department, Cambridge University Press, 100 Brook Hill Drive, West Nyack, NY 10994-2113, USA. Printed in the U.S.A.

Membership in MRS is $135 annually for regular members, $35 for students, and includes an electronic subscription to *MRS Bulletin.* Print subscriptions are available to MRS members for an additional $25. Individual member subscriptions are for personal use only. Nonmember subscription rates are $618 (USD) for one calendar year (12 issues). Requests from subscribers for missing journal issues will be honored without charge only if received within six months of the issue's actual date of publication.

MRS Bulletin is included in Current Contents®/Engineering, Computing, and Technology; Current Contents®/Physical, Chemical, and Earth Sciences, the SciSearch® online database, Research Alert®, Science Citation Index®, Materials Science Citation Index™, and Scopus.

Send Letters to the Editor to **Bulletin@mrs.org**. Include your name, affiliation, and full contact information.

https://doi.org/10.1557/mrs.2020.60 Published online by Cambridge University Press