PUMRS

Materials Today

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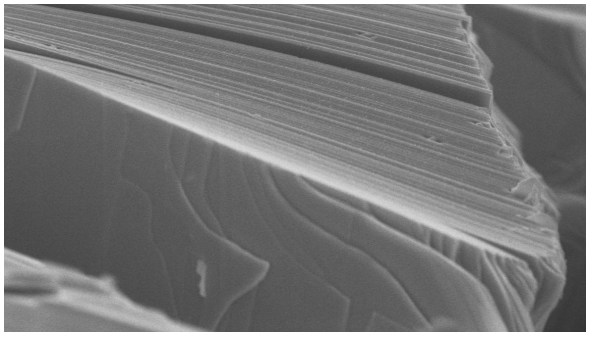
Notes From the Editor:

I am delighted to bring you the first edition of the Princeton University Materials Research Society (PUMRS) newsletter, Materials Today. Since the long-awaited return to in-person instruction, new club officers were appointed and they have been working very hard to bring back the vibrant club activities while remaining in compliance with university guidelines. Just last month, the club hosted a study break at Bowen Hall featuring graduate students from PRISM to share their experience in material science research, also including the beloved Professor Richard A. Register. I was encouraged by the turnout of the event despite the restrictions around in-person meetings. My peers and Sandra have also supported me immensely in launching the long-planned club newsletter. The purpose of the newsletter is to share monthly events planned by the university and the club, novel material science research, and news about PRISM faculty and MSE students. I hope that you will find the read entertaining and wish you a happy new year!

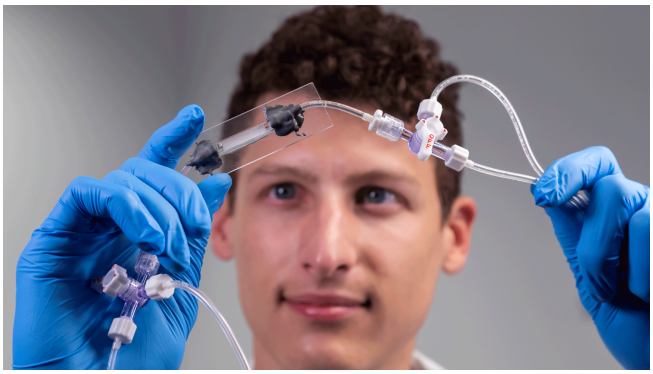
— Zihan Lin

PRISM Research

Princeton researchers helped to develop ultra-thin material layers for improving perovskite solar cell durability, a critical feature for commercial solar cells.



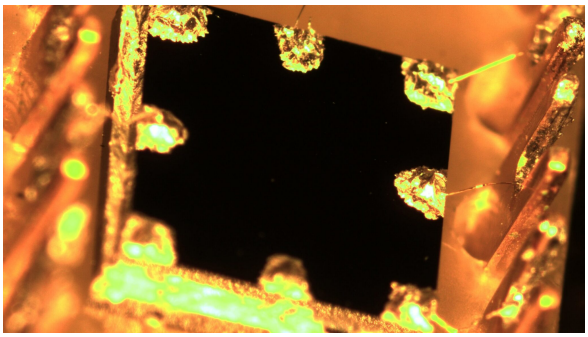
Read more on Princeton Engineering News



Princeton researchers have solved a 54-year-old puzzle about why certain fluids strangely slow down under pressure when flowing through porous materials, such as soils and sedimentary rocks. The findings could help improve many important processes in energy, environmental, and industrial sectors from oil recovery to groundwater remediation.

PRISM News
Read more on Princeton Engineering News

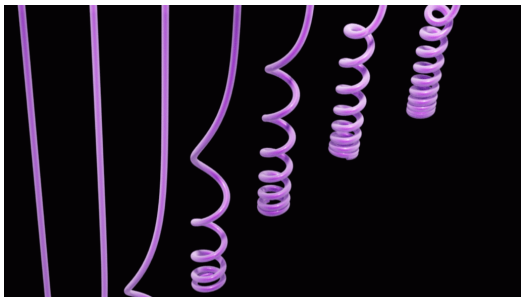
Princeton researchers have created the world's purest sample of gallium arsenide, a semiconductor used in devices that power such technologies as cell phones and satellites.



PRISM News
Read more on Princeton Engineering News

Tiny bubbles help create soft robotics

Princeton researchers have discovered a new method to create components that help soft robots move - bubble casting. Bubble casting works based on simple fluid mechanics principles to create delicate and flexible structures like star-shaped "hands" and "fingers" that can curl up one by one.



Read more on Princeton Engineering News

Faculty

Professor Emily Carter was honored with the Materials Theory Award for "advances in quantum mechanics theory with broad applications to materials and chemical sciences"

Read more on Princeton Engineering News
Video Interview by MRS

Materials News

Polymer discovery gives 3D-printed sand super strength

Nov. 13, 2021 | DOE/ORNL | ScienceDaily

Binder Jet Additive Manufacturing (BJAM) is an AM technique that has been used industrially to form 3D parts and composite materials through binding powdered materials (such as sand) with a polymer binder, but parts strengthened by conventional binders have not been strong enough for widespread use. Researchers from the Department of Energy's Oak Ridge National Laboratory have now discovered a new binder, **polyethyleneimine (or PEI)**, that could be used in BJAM coupled with a superglue to form a sand composite stronger than any known building material.

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Efficient organic solar cells processed from green solvents

Nov. 29, 2021 | Linköping University | ScienceDaily

Organic solar cells that have the highest energy efficiency typically have low boiling point and toxic ingredients. Scientists at Linköping University in Sweden and Soochow University in China achieved record energy efficiency of organic solar cells using high boiling point, nontoxic materials.

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Innovative textile vents to release heat when you sweat

Moisture opens the vents, rather than electronics

Dec. 15, 2021 | Duke University | ScienceDaily

Material Scientists at Duke University developed a nylon-silver hybrid textile material that has adaptive heat management. The material can retain heat when dry and vent in response to sweating.

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