ADVANCED MATERIALS TECHNOLOGIES

Supporting Information

for *Adv. Mater. Technol.,* DOI: 10.1002/admt.202101032

Facilitating Large-Scale Snow Shedding from In-Field Solar Arrays using Icephobic Surfaces with Low-Interfacial Toughness

*Abhishek Dhyani, Christopher Pike, Jennifer L. Braid, Erin Whitney, Laurie Burnham, and Anish Tuteja**

Supporting Information for

Facilitating large-scale snow shedding from in-field solar arrays using icephobic surfaces with low-interfacial toughness

*Abhishek Dhyani, Christopher Pike, Jennifer L. Braid, Erin Whitney, Laurie Burnham, Anish Tuteja**

Abhishek Dhyani, Prof. Anish Tuteja
Macromolecular Science and Engineering
University of Michigan
2800 Plymouth Road
Ann Arbor, MI, USA - 48109
Email – atuteja@umich.edu

Abhishek Dhyani, Prof. Anish Tuteja
BioInterfaces Institute,
University of Michigan
2800 Plymouth Road
Ann Arbor, MI, USA - 48109

Christopher Pike and Prof. Erin Whitney
Alaska Center for Energy and Power
University of Alaska
505 South Chandalar Drive, Fairbanks, AK 99775

Dr. Jennifer L. Braid and Dr. Laurie Burnham
Photovoltaics (PV) and Materials Technology Department
Sandia National Laboratories
Albuquerque, NM 87185

Prof. Anish Tuteja
Department of Materials Science and Engineering
University of Michigan
2800 Plymouth Road
Ann Arbor, MI, USA – 48109

Prof. Anish Tuteja
Department of Chemical Engineering
University of Michigan
2800 Plymouth Road
Ann Arbor, MI, USA - 48109

* indicates corresponding author.

This PDF file includes

Table S1
Figures S1-S4

Supplementary Tables

Table S1. Composition / Properties of the different experimental coatings used in field study.

	MC2	MC6
Composition	PVC + 60%MCT (thermoplastic)	SYLG 184 1:3 SYLG 527 (silicone thermoset)
Thickness, t (μm)	~ 5	~ 45-50
Water contact angle (Adv/Rec)	95° ± 2° / 83° ± 1°	113° ± 1° / 101° ± 2°
Ice adhesion strength, $\hat{\tau}$ (kPa)	35 ± 13	37 ± 7
Interfacial toughness, Γ (J/m^2)	0.33 ± 0.07	0.21 ± 0.05

Supplementary Figures

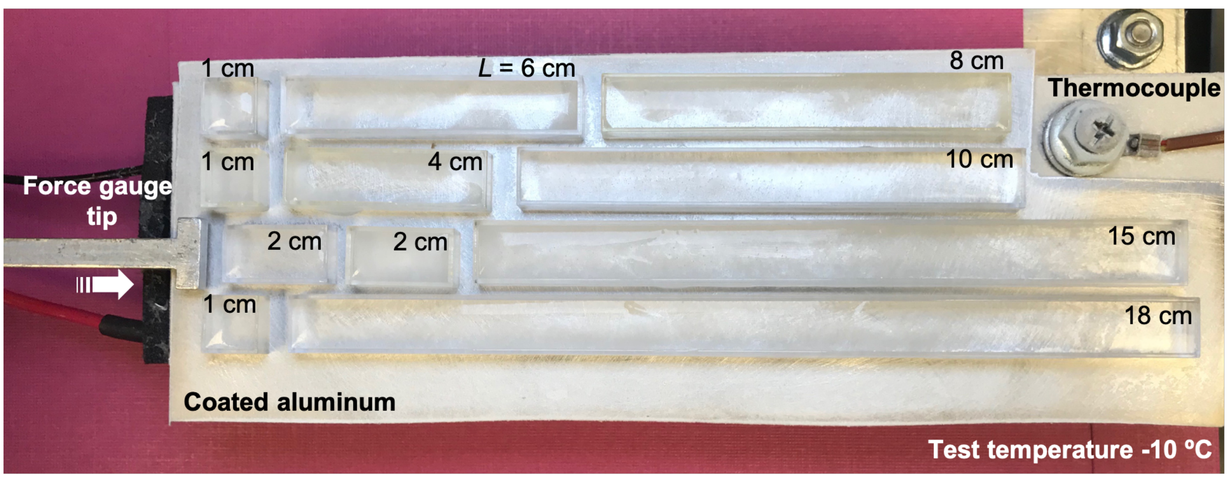

Figure S1. Ice blocks of different sizes frozen on a coated aluminum substrate adhered to a Peltier plate at -10 °C. Each ice block is contacted individually with a force gauge that measures the ice detachment force from the surface. The surface was subjected to at least 5-7 icing de-icing cycles and each length was tested at least four times.

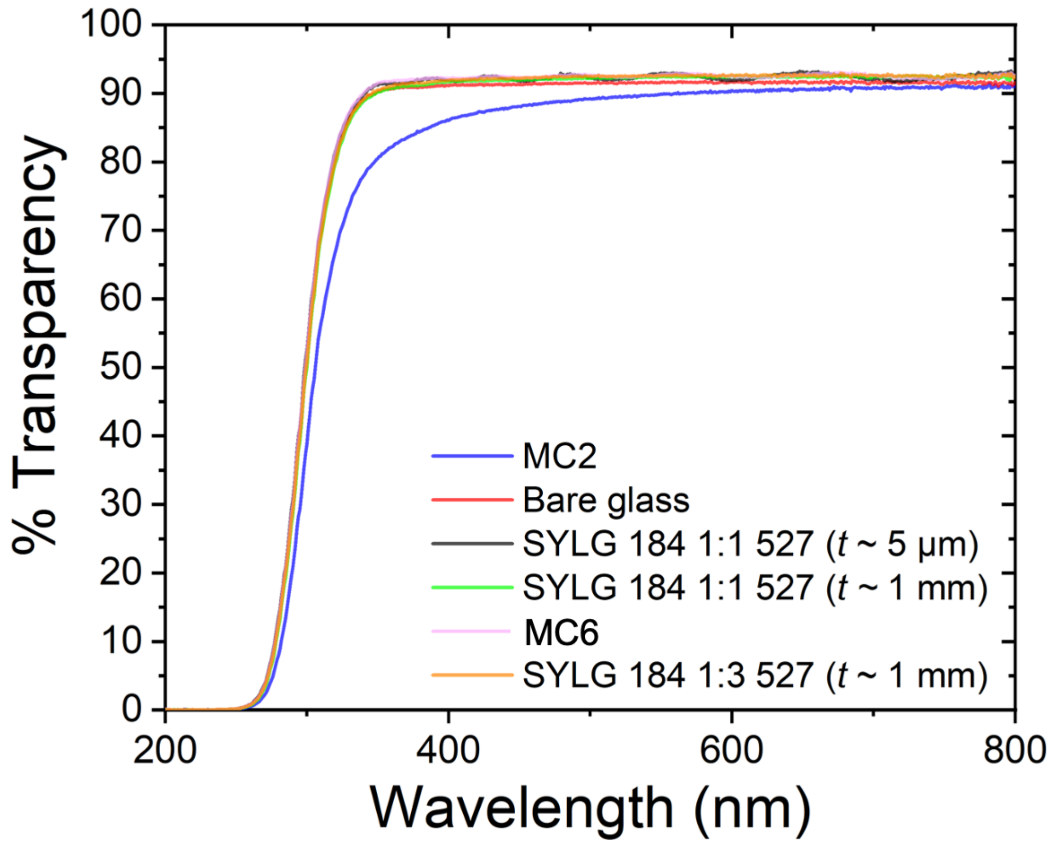

Figure S2. Optical transmissivity experiments on bare glass and glass coated with different coatings used in this study.

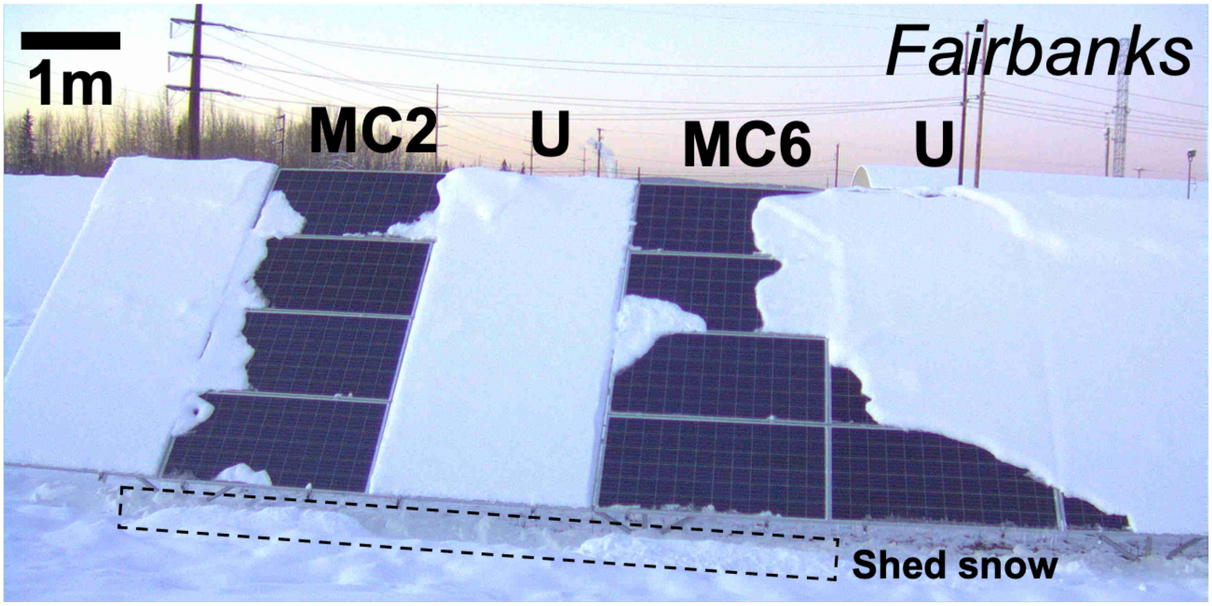

Figure S3. PV modules layout in Fairbanks, Alaska. Each column comprised of four modules with the same surface. Each coated column was separated by an uncoated column. Surfaces include: uncoated, bare glass (denoted U), column with glass and frames coated with MC2 (denoted MC2) and column with glass and frames coated with MC6 (denoted MC6).

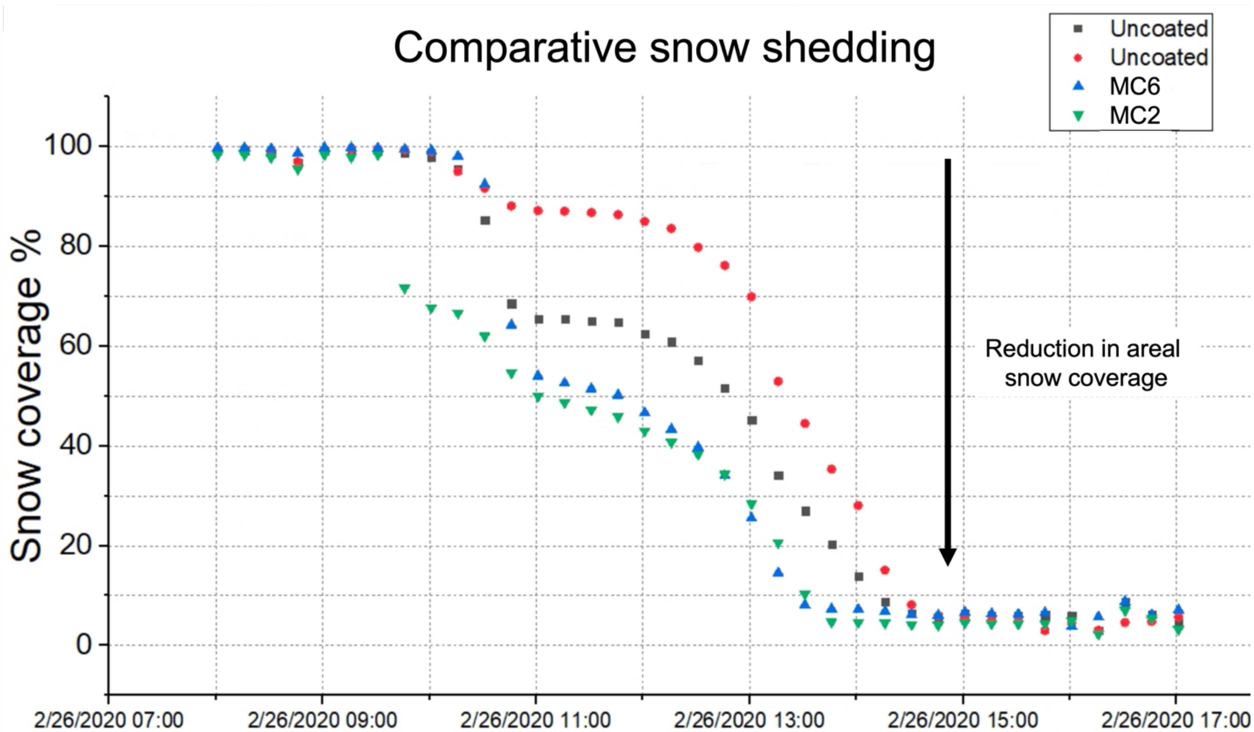

Figure S4. Snow shedding event on different surfaces in this study marked by a reduction in areal snow coverage with respect to time.