Abstract Submitted
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Transformative Skin: From Anti-biofouling to Reliable Power Cable

XUANHE ZHAO, Soft Active Materials Laboratory, Duke University —
This talk will discuss the fundamental physics and potential applications of trans-
formative skin, an electroactive polymer system recently developed at Duke Soft
Active Materials Laboratory (SAMs Lab). The working mechanism of the trans-
formative skin is based on the creasing-to-cratering instability in polymers under
electrical voltages. The instability can induce failures in power cables and polymer
capacitors. By suppressing the instability, one can greatly enhance the reliability
and energy density of the cables and capacitors. Surprisingly, the same instability
can generate a rich variety of on-demand patterns on polymer surfaces in response to
voltages. The feature size of the pattern can be tuned from millimeter to nanometer.
The pattern formation and surface deformation can dynamically debond biofilms
formed on polymer surfaces, giving extraordinary capability of active antibiofouling.

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Xuanhe Zhao
Soft Active Materials Laboratory, Duke University

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