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Low voltage switching of crease patterns on gel surfaces with topographically patterned microelectrodes[1] BIN XU, RYAN HAYWARD, University of Massachusetts Amherst — Exercising precise control over surface instability patterns on soft hydrogels is of significant interest for applications in biological and biomedical contexts. Here, we show that patterns of surface creases can be successfully programmed on thin hydrogel layers by applying a direct current electric voltage to underlying micro-patterned electrodes. We characterize the dependence of the critical switching voltage on the swelling of the gel layer and the geometry of the electrode array, as well as the depth of creases as a function of applied voltage and the switching kinetics. We also show that introducing topographically structured electrodes lowers the critical voltage slightly, and provides better control over crease shape. To better understand the mechanism of electrically-triggered creasing, we have developed an *in situ* strain mapping technique based on bleaching of markers within the gel layer.

[1]Polymer Science and Engineering Department University of Massachusetts Amherst, 01003 MA USA

Bin Xu
University of Massachusetts Amherst

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