Piezo-ionic effect based Mechano-visualization Skin with Visco-poroelastic Electrochemiluminescence

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Many research efforts devoted to achieving high sensitivity of soft electronic skin (e-skin), recent designs for these devices have focused on strategies for transduction of spatially resolved sensing data into straightforward user-adaptive visual signals. However, many light-emitting based mechanical sensing devices have limitations in terms of low sensitivity to mechanical stimuli and complicated fabrication processes.

In this talk, we propose the electrochemiluminescence skin (ECL skin) device exploiting the piezo-ionic effect, as an alternative strategy capable of transducing mechanical stimuli into visual readout. The proposed material shows visco-poroelastic response to mechanical stress, which induces a change in the distribution of the luminophore in the film. As a result, Emission from our ECL skin is increased with the applied mechanical stress. The unique operation of the ECL skin are expected to provide new insights into the design of materials for human-machine interaction.