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(54) **STRETCHABLE IONICS FOR TRANSPARENT SENSORS AND ACTUATORS**

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(57) **ABSTRACT**

A class of devices enabled by ionic conductors is highly stretchable, fully transparent to light of all colors, biocompatible or biodegradable, and capable of operation at frequencies beyond 10 kilohertz and voltages above 10 kilovolts. These devices enabled by ionic conductors can be used as large strain actuators, full-range loudspeakers, as strain or pressure sensors and as stretchable interconnects. The electromechanical transduction is achieved without electrochemical reaction. When large stretchability and high optical transmittance are required, the ionic conductors have lower sheet resistance than all existing electronic conductors.

24 Claims, 25 Drawing Sheets