

## High-Performance Ionic Polymer based Mechanotransducer with Embedded Inorganic Particles for Soft Haptic Devices

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Recently, an ionic electroactive polymer (i-EAP) actuators are spotlighted in various soft electronics such as robotics and haptics due to a lot of advantages. However, many i-EAP studies suffer from actuation properties of low blocking force, and narrow bandwidth for apply to soft haptic feedback. Thus, in order to enhance the blocking force of the i-EAP actuator, highly-performance actuators take advantage of inorganic materials having a high mechanical modulus.

Herein, we describe an ionic polymer-metal composite based mechanotransducer (IPMCM) performing high blocking force and wide bandwidth. The hydrogen bond based composite material increase the actuation performance of blocking force and wide bandwidth through the high modulus of inorganic materials. As a result, the IPMCM was operated a wide bandwidth of up to 100 Hz as well as a high blocking force of 1.0 mN. We expect that our device can serve as an ideal guide to human-machine soft haptic interface.