

## Mechanosensitive Hydrogen Bond-Triggered Ion Pump Based Artificial Synaptic Tactile Transistor

김윤아, 김주성, 권혁민, 김도환<sup>†</sup>

한양대학교

(dhkim76@hanyang.ac.kr<sup>†</sup>)

Currently, the progress in tactile interface for a neuromorphic system has drawn a lot of focus as a next-generation bioinspired artificial sensory perception system for e-skin. However, previous researches have been confronted with mechanotransduction sensitivity, signal crosstalk and limited plasticity which are caused by the integration of tactile sensors and synaptic transistors in parallel.

Herein, a synaptic tactile transistor (STT) based on hydrogen bond triggered ion pump capable of ion diffusion/migration as a result of the reversible H-bond breakage of ion pairs on silica particles surface under mechanical stimulus was achieved. The released free ions are penetrated into the bulk regime of polymer semiconductor, hence, inducing mobile hole charges. Consequently, the STT realized both short and long term plasticity (LTP > 250 sec) with respect to the applied amplitude of pressure. With this system we will be able to provide new insight into developing synaptic electronics for humanoid robots and neural prosthetics.