# Electrostatic Induced, 3-Dimensional Spatial, Logic Sensation of Polyvinylidene Fluoride based Flexible Film

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## Abstract

New tactile sensing technologies have attracted more attention recently. Here, we demonstrated that the reduced graphene oxide/polyvinylidene fluoride (rGOPF) flexible film could effectively recognize, after triboelectrification, the 3- dimensional (3D) motions of human fingers with a polyethylene terephthalate (PET) cover through the induced positive/negative or strong/weak potential responses. Results show that this electrostatic induced potential could be up to ~ 78 ± 8 mV (touch mode) and ~ 30 ± 5 mV (touchless mode) under the defined conditions, respectively. A phenomenological scheme was proposed to explain these phenomena. It is based on the material microstructure and the classical theories of electrification and electrostatic induction, and confirmed via a series of experiments. To highlight the practical applications of this 3D-spatial sensing technique for human-finger electronics, two pairs of electrodes were integrated into an rGOPF flexible film to enhance its logic recognition capability from one axis to all directions. We illustrate its accurate recording capability for both Chinese character "中" and English letters "K-S-A" as a touchless, self-powered flexible writing panel. This sensing technique provides a new sensing experience that the present array sensors via a touch mode can't offer.

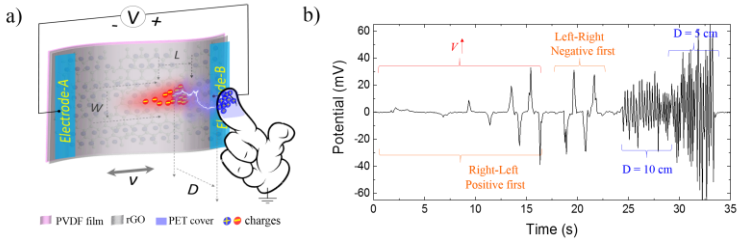


Figure 1: A smart reduced-graphene-oxide/polyvinylidene-fluoride (rGOPF) flexible film

## References

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