High Performance Pressure Sensor using Ferroelectric Polymer Nanofiber

The thin film consisted of arrayed organic piezoelectric nanofibers is capable to generate high output voltage and 3D flexibility.

KRI will propose R&D projects for device application using the new sensor, e.g. wearable sensors with human affinity, and so on.

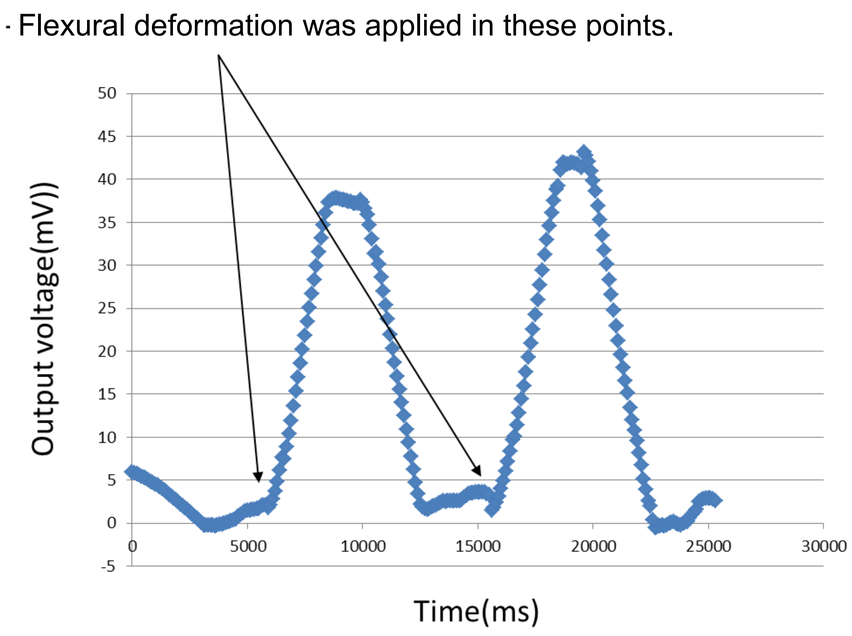
Background & purpose

- KRI has know-how to form many kind of the electrospun nanofibers, and can control their orientation leading to form transparent and highly flexible films which are consisted of various polymer fibers.
- Novel pressure sensor with flexibility is created by the films.

Characteristics

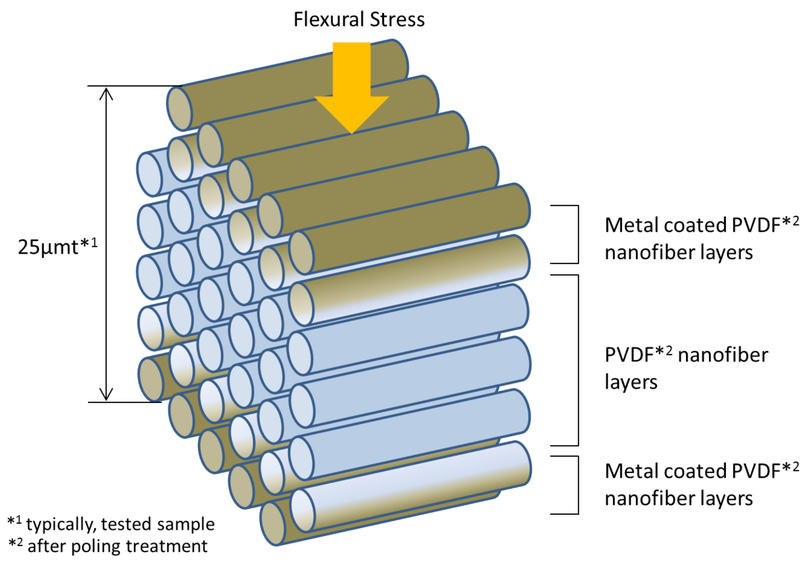
1. The thin film consisting of arrayed PVDF fibers of 50-100nm in diameter was formed by electrospinning method.
2. High output of ca.40mV appeared because of one directional gathering nanofiber sensor units.
3. Because the film is high flexibility, the shape is easily changed to cover complicated 3D objects. Furthermore, It is superior in human-affinity. You will touch it and find that it is neither cold nor stiff.

	KRI	Polymer film	PZT system
Structure	**Arrayed nanofiber with 50-100nm diameter**	**Oriented film**	**Orientated grain**
Thickness	**-10μm**	**10-100μm**	**μm**
Output level	**mV**	**μV**	**V (multilayered)**
Flexibility	**◎ (Conformability)**	**○**	**×**
Transparency	**○**	**×**	**×**

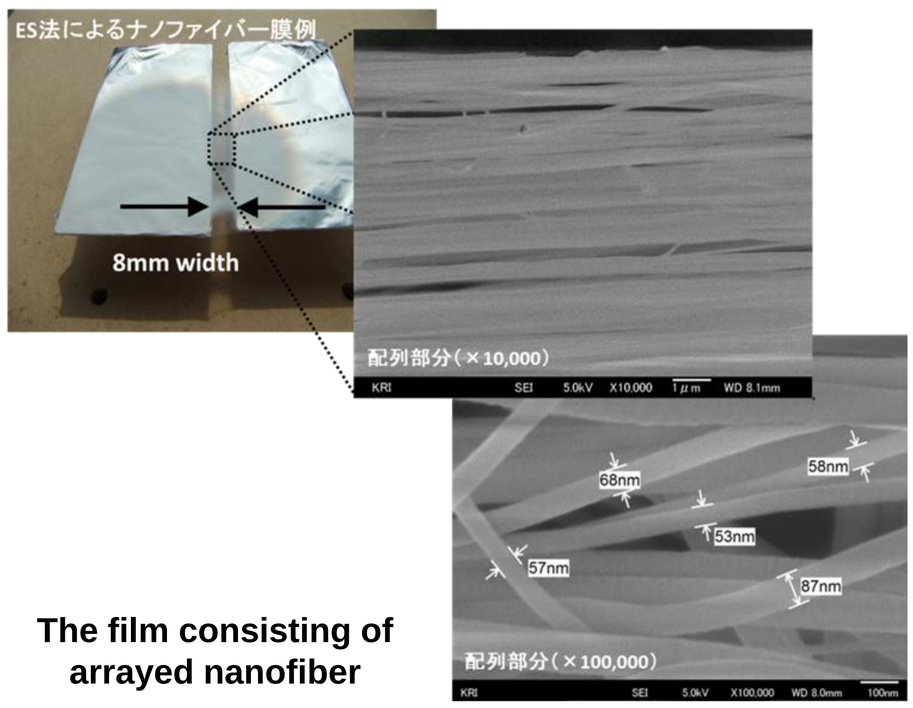


Output voltage change after flexural deformation applied to the film.

3D flexible film formed by electrospinnig method



Schematic illustration of the novel pressure sensor composed of uniaxial oriented PVDF nanofibers.



The film consisting of arrayed nanofiber

Proposal from KRI

- KRI will propose R&D project for device application of the new pressure sensor using the arrayed nanofiber films formed by electrospinning method, which has output selectivity along to the fiber axis.
- Highly biocompatible soft devices made from the arrayed nanofiber film will bring about novel wearable devices, robots and medical devices.

PAT.PEND.

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