Nanopaint piezoelectric Ink

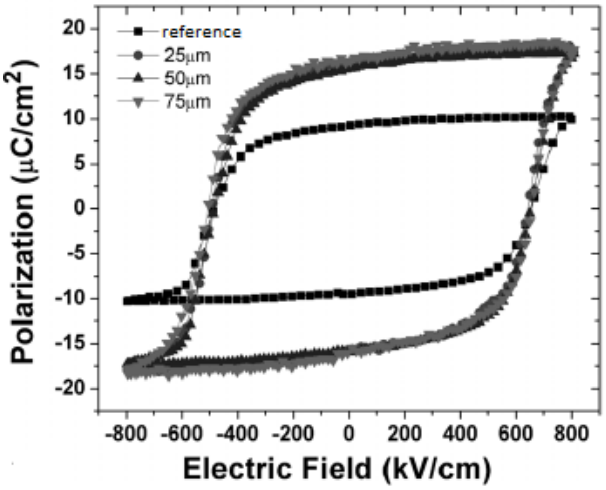
Nanopaint piezoelectric ink is produced through a high- quality process in order to exhibit a unique set of inherent piezo and pyroelectric proprieties.
It can be applied on various substrates, such as glass, PET, PC or paper, by various printing techniques:

- Screen printing
- Doctor blade printing
- Inkjet printing
- Spray printing

Nanopaint piezoelectric ink shows distinctive properties:

- High strain with low applied voltage, which gives a good actuation power;
- High dielectric constant suitable for applications that require rapid response, sensibility and flexibility with minimum thickness;
- Easy production process allowing different sensor configurations;
- Ideal for R&D in printed electronics and novel interfaces, capable of detection of pressure, impacts, accelerations and deformations in the substrate.

Polarization vs Electric field for different thicknesses solvent-casting films.



Applications:

- Automotive and medical industries
- Air bag sensors, airflow sensors, keyless door entry, knock sensors, vibration energy harvester
- Consumer
- Humidifiers, flexible foil speakers, smart buttons for gamepads and keyboards, smart wearables for casual wear or sports
- Force sensors

Instructions:
Before use, place the ink in a mechanical stirring for 15 minutes.

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Technical Properties

Base polymer	PVDF-TrFe
Melting Temp. range(°C)	~150
Density (g/cm3)	1.9
Piezoelectric/Pyroelectric values	
Piezoelectric coefficient d33 (pC/N)	-23
Pyroelectric Coefficient ρ, (µC/m^2.K)	-23
Remnant Polarization P_r(mC/m^2)	80
Dielectric values	
Dielectric const. range @1 KHz, 25 °C	11.5
Coercive field (KV/cm)	450
Poling min. (KV/cm)	600
Poling max. (KV/cm)	1000
Mechanical values	
Young Modulus range (GPa)	0.61
Screen Printing properties	
Mesh count, warp (n/cm)	165
Wire diameter, warp (µm)	30

Annealing:

Annealing above Curie transition temperature is required as the following procedure:

- Temperature: 135-140 °C
- Duration: 15 minutes

This step is recommended in order to increase polymer crystallinity properties and final sensor performance.

Poling:

The ink must be poled to enhance their piezoelectric proprieties through a Corona or Contact method. The process is made by applying an electric field with a voltage above the coercive field.

Polling can also be performed while heating the sample and applying a constant electric field.

Typical poling values:

- Voltage: 50 V / µm
- Temperature: 80-120 °C
- Duration: 60-90 min

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