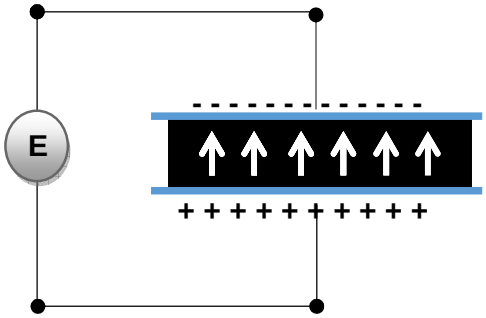
Piezotech Processing's guides

- How to pole –

In order to activate a copolymer material, a poling step is necessary. Using an increasing low-frequency voltage, an electric field above the coercive field value (*i.e.* 50V/µm) has to be applied. Depending on the film thickness, its surface, and the response precision needed, different methods can be used.



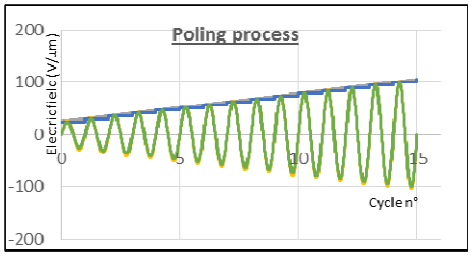
Orientation of Crystalline Phases

The application of the electric field and the hysteresis curve characterization can be done using one of the following:

- A direct application of the electric field through the electrodes with a voltage generator (in this case there is no measurement of the induced electrical polarization (charge displacement))
- A Sawyer-Tower circuit (electrical charges measurement, hysteresis curve)
- A ferroelectric tester (*i.e..*, *Precision MultiFerroelectric Radiant Technology*) with an external amplifier if a high electric field is needed (depending on the film thickness)

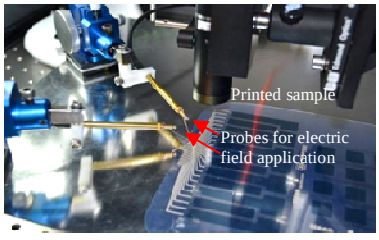
When a voltage generator is coupled with a signal generator, the electric field can be applied according to the following parameters:

- Number of cycles to reach E_{max}: 15
- Frequency: 0,5Hz (higher is possible)
- Signal: sinusoidal
- $E_{max} > 2E_c$
- Typically E_{max}=100V/µm

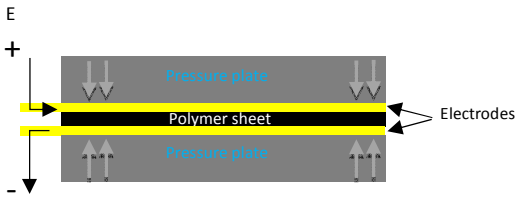


Typical poling process used for copolymer polarization

For printed devices (mainly thin layers), the poling electric field can be applied directly through the film electrodes by using a direct probes contact system. For non-printed films (thick layers), poling can be done through contacting and pressing the film between two electrodes. For large surfaces, a Corona poling can be used.



Direct probes poling process



Contact poling process

Safety and Storage

Please refer to the safety datasheet

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