

# What are electrets?

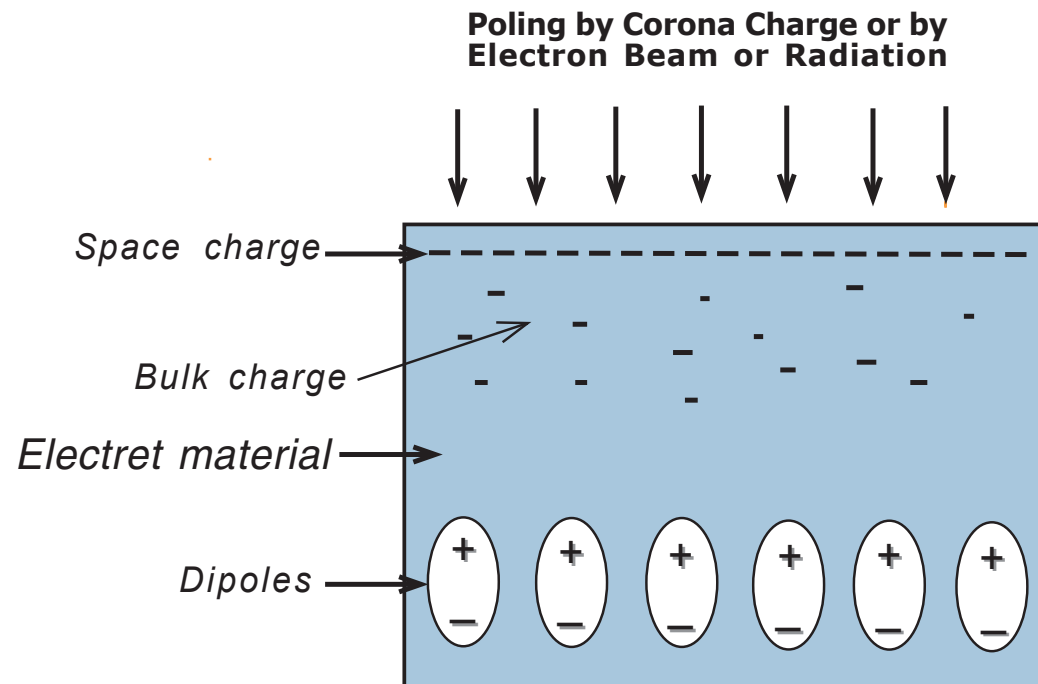


**Electrets:** dielectric materials exhibiting quasi permanent electric charge

a) Space charge polarization near the electrodes.

b) Bulk charges trapped inside material at the interfaces or due to migration.

c) Dipolar polarization due to polar molecules.



# Where we use electrets?



Electret properties are important for applications such as:

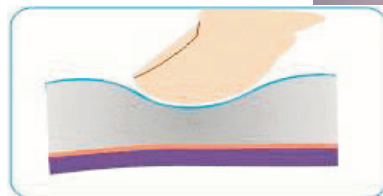
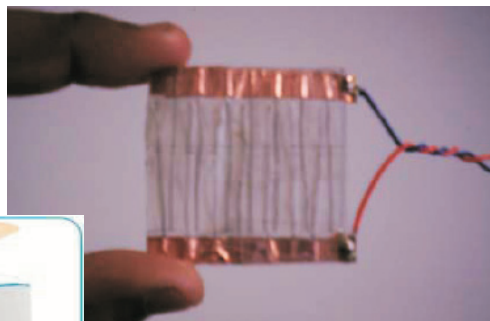
◇ Microphones



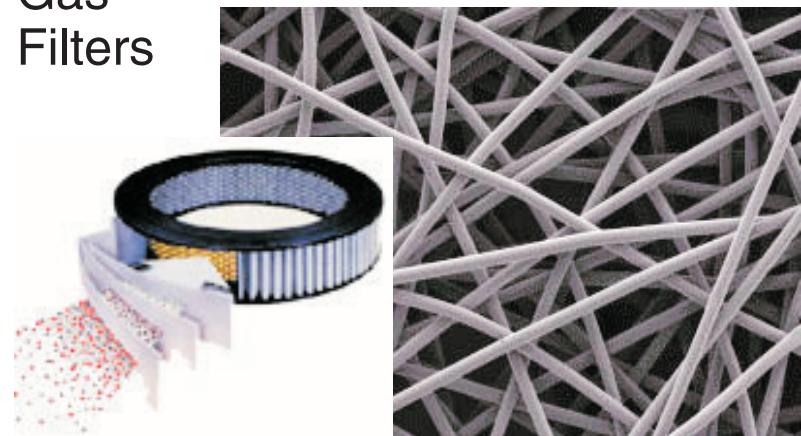
◇ Solar cells

◇ Dosimeters

◇ Piezoelectrical transducers



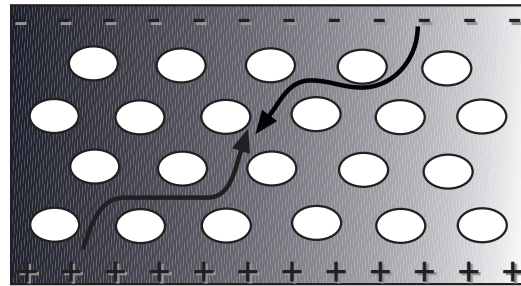
◇ Gas Filters



# How we can improve electret properties?

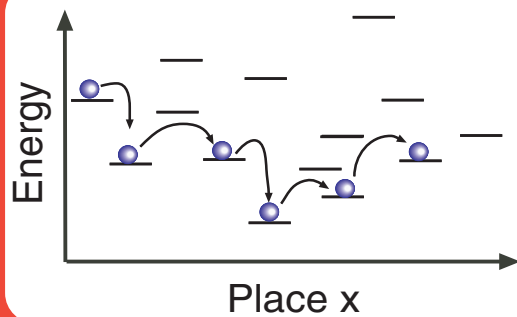


## Morphology



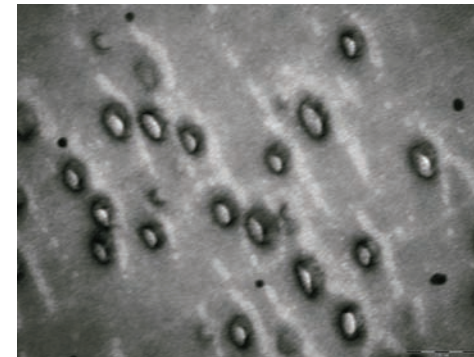
**Aim: To delay charge carriers drift**

## Traps



**Aim: Formation of deep traps**

## Blends



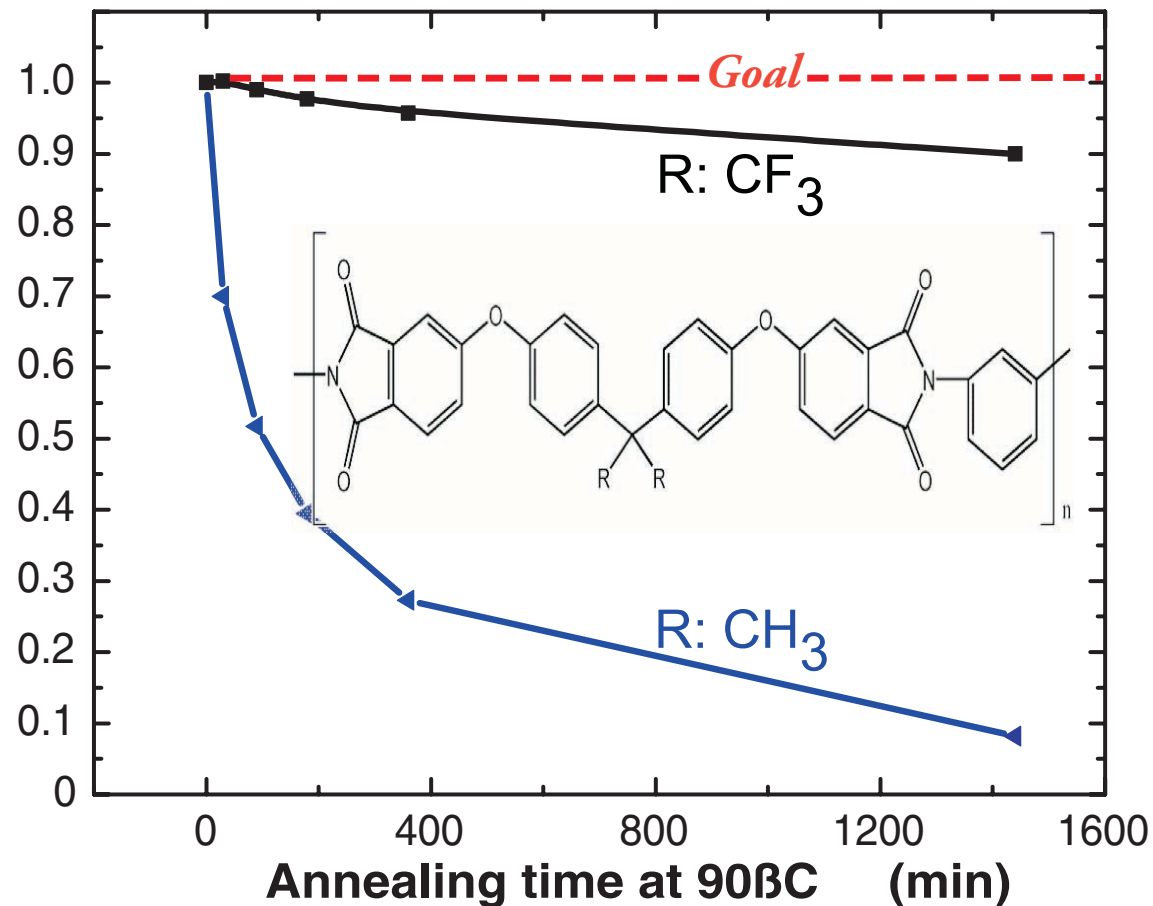
**Aim: To increase conformational disorder**

# Improving electret properties



1. Modifying the polymer electret matrix itself or by additives (stabilizers, nucleating agents)

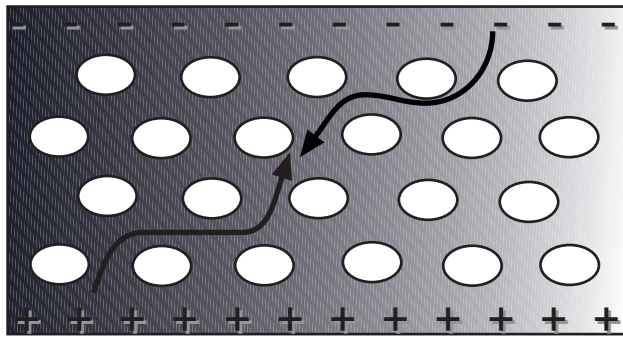
## Norm. Surface Potential



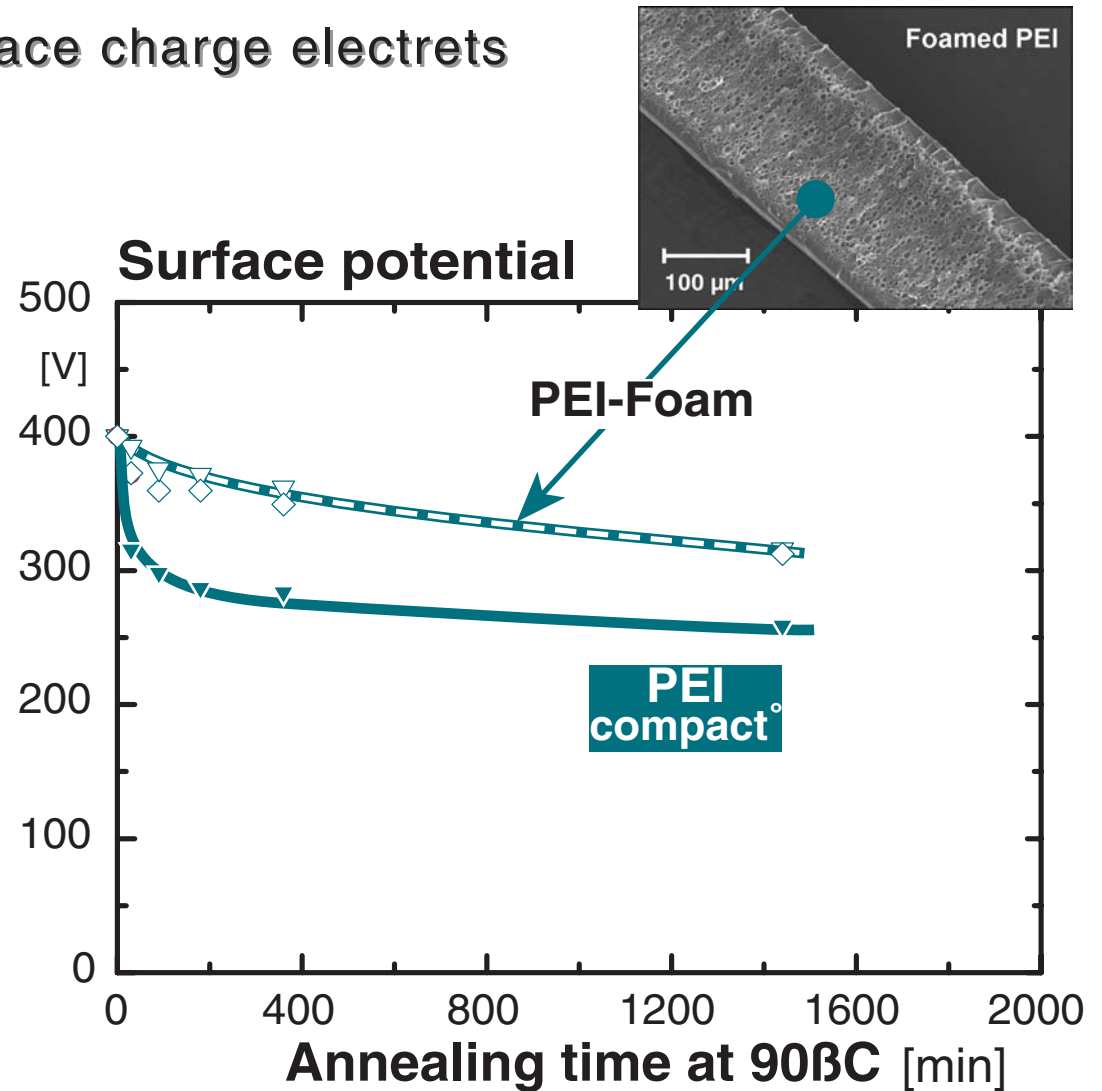
# Improving electret properties



## 2. Development of cellular space charge electrets



Obstruction of the charge drift by the cavities within the film



# Improving electret properties

## 3. Blending

PPE/PS



Larger degree of molecular packing compared with neat polymers

PPE/PS/SIBS



Immiscible blend morphology

