

Organic electronics is becoming an increasingly common element of our lives, until a few years ago devices based on LED matrices (light emitting diode) barely replaced the previous technology, and we are now, where OLED technologies (organic light-emitting diodes) are now successfully competing with old LED technology. Most of us already own organic displays in smartphones (AMOLED, Samsung, iPhone etc.) and we hear more and more about organic lighting and transparent, flexible TVs. Moreover, organic technologies have shown that we do not have to think schematically about electronic devices as bricks but as thin flexible elements (foils) that can be implemented anywhere from walls, furniture to clothes and skin. There is one problem with organic electronics it's like with all the living organism, working devices are generating heat and a lot of this heat is dissipated. Every year we observe a rise in global temperature due to the greenhouse gasses generated by i.e. burning fossil fuels. We need electricity to power all tools, smart devices, and drive cars. In many cases, this electricity is generated by burning coal. We need to heat houses using electricity or burning fossil fuels. We try to make everything less power demanding, we are building energy-efficient smart homes, which helps but it does not solve all of the problems. In many cases/devices, we are losing a lot of energy that could be recovered and here the organic thin-film thermoelectric generators have a role to fulfil. **The project addresses the HEAT problem or how lack of it is reused.**

We do not plan to simply use materials present in the literature, but firstly, understand the global and local mechanism involved in energy transport in organic materials. Secondly to develop new, more efficient small molecule and polymer materials that could be used in high vacuum thermal evaporation or solution process. We will study the exciplex type of both small molecules and polymers as materials with control charge mobility, thermal properties and crystallinity character. As the final aspect of the work, we will design organic electronic device like OLED and OPV with integrated organic thermoelectric device to recover the heat and reuse the electric energy.