

## **Summary**

The project is a joint effort between Macromolecular Chemistry, Physical Chemistry and Experimental Physics in which three groups bring in complementary expertise from different fields such as synthesis, morphological studies, and device physics. The aim of the project is to design, synthesize, and study fully functionalised self-assembling block copolymers to realize and optimize nanostructured bulk heterojunction solar cells. Block copolymers guarantee desired stable nanoscale morphologies throughout the bulk, keeping the domain size in the same range as exciton diffusion lengths. Novel block copolymers will be synthesized designed to optimize the efficiency of photoinduced charge separation and charge transport in a system with a well controlled stable nanostructure based on microphase separation and crystallization. Structure formation processes will be studied in detail in order to gain the necessary understanding for a rational design of suitable processing steps for film formation. The electro-optical properties of the resulting materials will be investigated with the aim to understand the physics of solar cell devices based on the materials developed within the project.