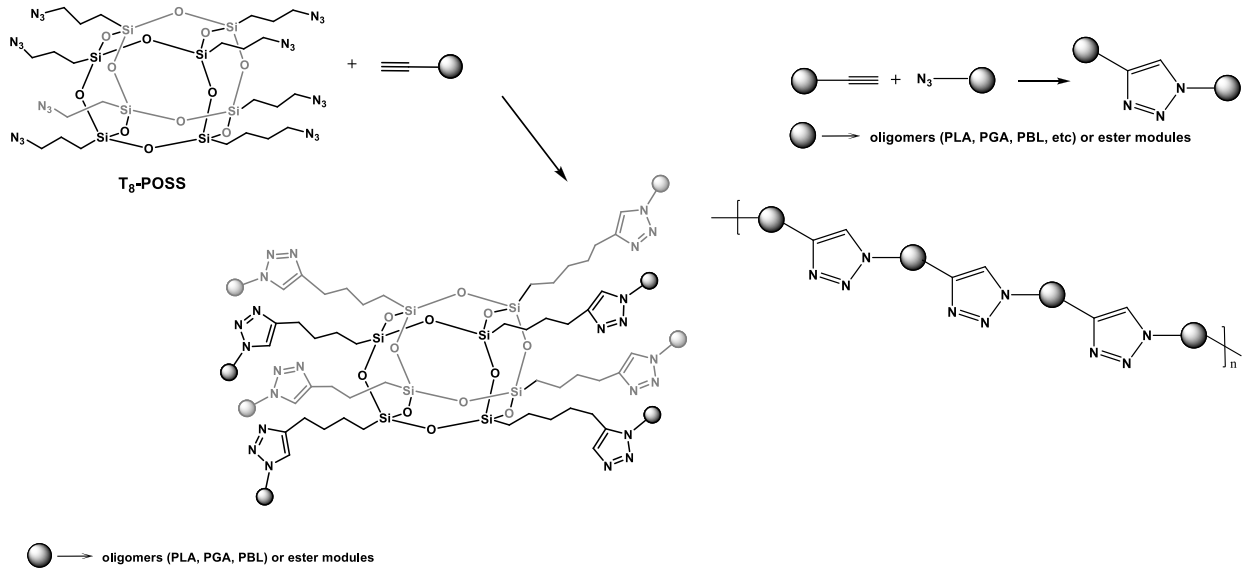
Sequence encoded biocompatible polyesters: design, functionalization and applications

Biocompatible polyesters so-called green polymers have wide spectrum of application among others in environmental protection, commercial bioproducts, medicine, pharmacy, nanotechnology. The unique properties essential for specific application are guaranteed by precise microstructure of polymer chain. While, the molecular microstructure of synthetic copolymers is not so sophisticated and precised to those typical for biopolymers. **The project proposed new concept of synthetic strategy for sequence encoded polyesters which guarantee the copolymers formation possessing ideal, errorless chain architecture. The new synthetic strategy is more versatile than literature propositions.** The coupling of appropriate modules in any, but planned order, is permissible, even those biologically active building blocks. Designing and formation of precise polyester require to develop effective catalytic synthetic method for obtaining functional modules for coding of polymer chain. For this purpose the new initiators of ROP and alcoholysis reaction of cyclic esters will be planed. Functional modules will be linked in linear sequences by “click” reactions. The ultra-short polymer chains will be constitute reactive arms for hybrid-star copolymers with T_8-POSS core.



The main result of the project will be novel class of sequence encoded biocompatible polyesters possessing unique properties interesting not only in bioapplication field. These findings open up new application potential in the fields of data storage, product identification, molecular codes. Additionally, the potential results may be the base for new barcode construction, tagging products, errors detection. The microstructure control over selective polymer sequences is effective strategy for tuning macromolecular properties of polymer materials.