The aim of this project is the synthesis of new macrocyclic systems with carbon atoms in the bridgehead position. In the proposal a series of the systems, which will contain a cavity structure which is able to complex metal ions. These systems are a very interesting part of one of the fields of chemistry called supramolecular chemistry. Due to discovery and spreading by Pedersen the crown ethers were studied worldwide on their complexing properties. The derivatives of crown ethers such as lariat ethers and cryptands are widely used in today's supramolecular chemistry as well as in the asymmetric synthesis as organocatalyst. The presented project illustrates the synthesis of new cryptands with the bridgehead carbon atoms hitherto not described in the literature. On the other hand the most popular cryptands are bridgehead nitrogen atoms. They just gained great fame and still are widely utilized in organic chemistry. The presence of lone electron pair on the nitrogen atom well suited as ligands. For cryptands with bridgehead carbon atom their properties are not yet fully investigated. The literature search show there is no comparison of the properties of the C-cryptands and N-cryptands. For this reason, the proposed project can play very important part to improve the knowledge of the properties of new structures. Simple transformation of readily available starting materials, and the proposed new synthetic track is also interesting point of this project. For synthesis of macrocyclic system the application of a nucleophilic opening-ring reaction of the epoxides will be needed. This reaction is an example of reaction response to the trend of the modern concept of chemistry 'click' introduced by Nobel Prize Laureate, K. Barry Sharpless. The obtained podands, which are starting materials can be utilized to form complex systems, which is a major target of the before mentioned 'click' chemistry. The simple transformations of formerly used multi-step organic synthesis at the present time is limited to preparing of the starting materials and then those fragments can be combined in one unit what can be compared with the laying of Lego blocks.

In summary, the proposed short project is mostly based on the synthesis of the starting compounds and obtaining of new macrocyclic systems such as C-cryptands. Furthermore, the examination of complexing properties of the prepared compounds and their use in supramolecular chemistry or asymmetric synthesis is also very relevant and can be starting point to create another very interesting new proposal.