

2. Aim of the Work

The present work is part of a long-term project aiming at the construction of shape-persistent macrocycles with donor functions as building blocks for supramolecular constructions and eventually perhaps even nano-sized devices.^{36,37}

Macrocycles with bipyridine units, which were synthesized in a parallel dissertation, form complexes where the metal ions are most likely positioned exocyclically,³⁰⁻³³ thus opening the way towards Route f (Scheme 1, p. 2). As a counterpart to these systems, terpyridine units were selected here as building blocks. This should lead to macrocycles which can only be complexed endocyclically, and therefore would be interesting candidates for Route c-e.

Efficient strategies had to be evaluated for the preparation of novel building blocks, which had to contain the terpyridine group and appropriate functionalities for the macrocyclization reaction. For solubility reasons, they should also carry flexible substituents. The versatility of the strategies was to be shown by the preparation of a set of different macrocycles, which should differ in parameters like size, number of terpyridine units, and side chain pattern. The influence of these parameters on the structure and the properties of the macrocycles was to be examined. The flexible side chains are important to keep the macrocycles in solution, and the dependency of solubility on the side chain pattern was an important question.

There are practically no systematic studies available yet which would allow a rational design of macrocycles with the desired properties. If possible, X-ray analysis of single crystals should lead to conclusions about the packing behavior of the macrocycles in the solid state. In cooperation with physicists, the tendency of the cycles to form stable 2-D monolayers at interfaces had to be examined to allow a prediction regarding the accessibility of Route b (Scheme 1). Finally, first investigations into the cycles' complexation behavior should form the basis for later works in this area leading towards supramolecular systems like those depicted in Scheme 1.