

A preparation of non-racemic helically chiral aromatic compounds and their potential applications in asymmetric catalysis and nanoscience

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Helicenes are three dimensional polycyclic aromatic systems that consist of all ortho-fused aromatic rings and are inherently chiral. The unique 3D structure of helicenes is making them attractive in asymmetric catalysis, supramolecular chemistry, molecular electronic devices, material chemistry and other branches of science. Despite the fact that helicenes have been known since 1956, there are still limits in their multigram scale synthesis. Due to the synthetic difficulties, only few attempts were done in asymmetric synthesis, synthesis of long helicenes, heterohelicenes and functionalized helicenes. The thesis was mainly focused on development of a practical and general methodology for the preparation of functionalised helicenes and their heteroanalogues.

The second part of thesis is focused on finding a potential applications of helicenes in different branches of science.

The last part of thesis is focused on development of a practical approach to optically pure helicene analogues by means of asymmetric synthesis.