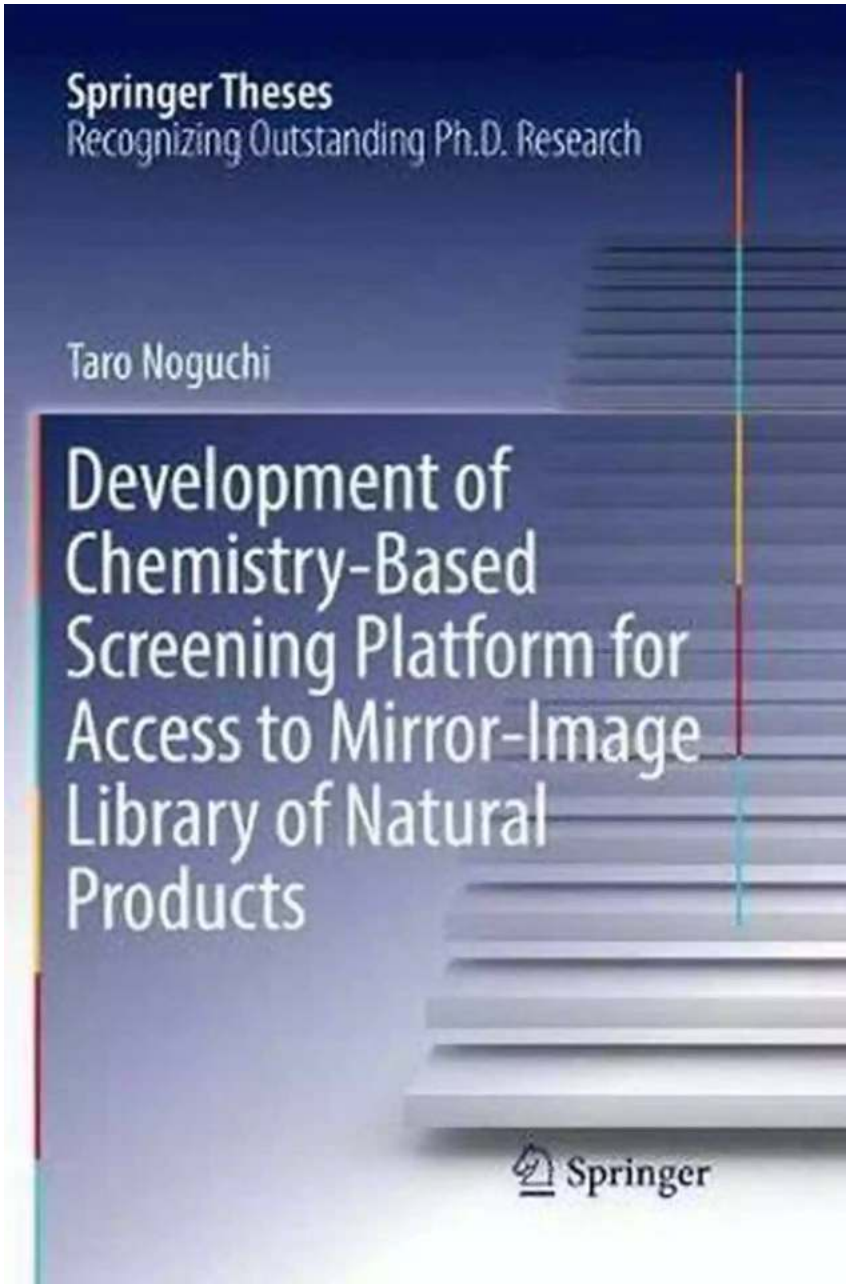
Unlocking the Power of Chemistry: A Revolutionary Screening Platform for Access to the Mirror Image



A major breakthrough in chemistry has been achieved with the development of a groundbreaking screening platform that allows access to the mirror image. This

advancement opens up a world of possibilities for drug development, chemical reactions, and materials science.

The Fascinating World of Stereochemistry

Stereochemistry deals with the three-dimensional arrangement of atoms in molecules and their effect on chemical reactions. While most substances have two possible mirror-image forms, or enantiomers, accessing the mirror image has remained a challenge for chemists for many years.

Development of Chemistry-Based Screening Platform for Access to Mirror-Image Library of Natural Products (Springer Theses)

by Manfred Braun(1st ed. 2018 Edition)

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The ability to work with both enantiomers is crucial in drug design and development. It has been discovered that a drug's efficacy, safety, and even side effects can be heavily influenced by the specific enantiomer used. In the past, chemists had to rely on tedious and time-consuming processes to access the desired enantiomer.

The Chemistry Based Screening Platform: A Game Changer

The newly developed chemistry based screening platform provides an innovative solution to the longstanding challenge of accessing the mirror image. By utilizing advanced computational algorithms and state-of-the-art laboratory techniques, researchers have successfully developed a system capable of efficiently screening for and producing desired enantiomers.

The platform combines the power of artificial intelligence, machine learning, and quantum chemistry simulations to identify suitable reactions and catalysts for enantioselective synthesis. Chemists can input their desired molecule structure and the platform will quickly provide optimized reaction conditions, catalysts, and reagents for the synthesis of both enantiomers.

This groundbreaking development drastically reduces the time and resources required for accessing the mirror image. Chemists can now design and synthesize drugs with improved efficiency, allowing for faster development of novel therapeutics.

Applications Across Various Fields

While the development of this chemistry based screening platform holds tremendous potential for drug design, its applications are not limited to the pharmaceutical industry. The ability to access mirror images efficiently opens up new avenues in materials science, agriculture, and chemical manufacturing.

In materials science, the platform can aid in the creation of chiral materials with unique properties. These materials have applications in optoelectronics, catalysis, and drug delivery systems. The ability to selectively produce a desired enantiomer allows for precise control over the properties of these materials, leading to advancements in various industries.

The Future of Chemistry

The development of this chemistry based screening platform represents a major leap forward in the field of chemistry. It not only simplifies the process of accessing the mirror image but also opens up new possibilities for research and development.

With continued advancements in computational chemistry and machine learning, it is expected that the platform will further refine its capabilities, providing even more efficient and accurate results. As a result, the synthesis of mirror image compounds will become an integral part of chemistry research and drug development.

The future holds exciting prospects for chemistry, and this revolutionary screening platform is at the forefront of this new era. Researchers and scientists can now unlock the full potential of stereochemistry, leading to groundbreaking discoveries and advancements that will shape our world.

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This thesis mainly describes the development of a screening process for a mirror-image library of chiral natural products. It demonstrates how, by using mirror-image proteins for the screening of available natural products, unavailable mirror-image isomers of natural products can be screened in a mirror process. Moreover, as mirror-image isomers including target proteins and natural products are mainly prepared by means of chemical synthesis, the screening strategy presented here suggests the importance of organic chemistry.

Natural products are commonly used as valuable resources for drug discovery. However, as they are mostly produced as single enantiomeric forms, researchers have tested o

nly natural products bearing one stereochemistry available in nature. As natural products and their enantiomers have identical physicochemical properties and different biological activities, mirror-image isomers of natural products are promising candidates for novel medicinal resources.

In an effort to identify anticancer agents from the mirror-image library, chemical protein syntheses of some target oncoproteins, MDM2, MDMX and Grb2, and their applications to the chemical array screening process were achieved. In the course of this process the NP843 enantiomer, which is the enantiomer of an α-tocopherol derivative, was successfully identified as a novel MDM2-p53 interaction inhibitor. These results clearly show that a mirror-image library of chiral natural products represents an invaluable medicinal resource. Accordingly, the chemistry-based screening strategy described in this thesis will be of great interest to a broad range of chemists involved in natural product, medicinal, and synthetic chemistry.

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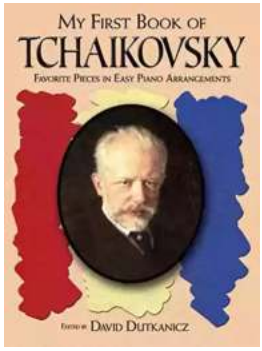

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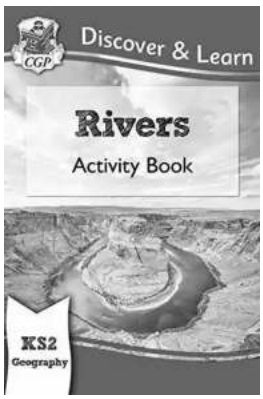

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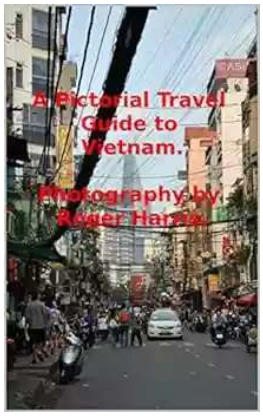

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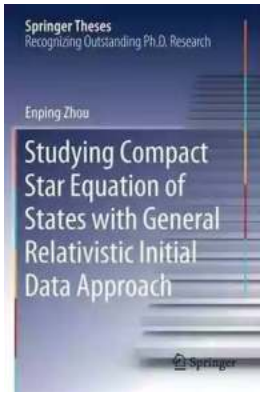

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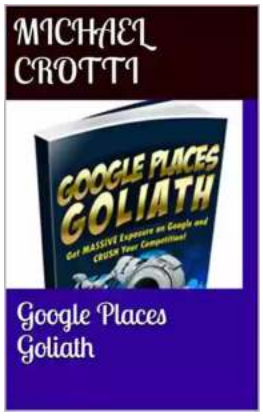

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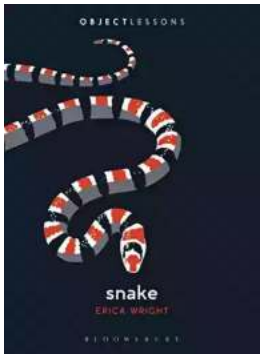

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