Honeycomb Host-guest System on HOPG for Applications in Supported Asymmetric Catalysis

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Heterogeneous catalysis has remained an underdeveloped field in organic chemistry, particularly in its asymmetric version. Nevertheless, it stands as a powerful tool, enabling the easy recyclability of the catalysts. However, ensuring optimal efficacy and cooperativity in such system remains a challenge in modern chemistry. The objective of this work is to develop a new heterogeneous catalytic system for the asymmetric hydrolysis of small meso epoxides using salen complexes. As shown in various studies, the cooperativity between two salen units enhances the enantioselectivity of the reaction and reduces the reaction time[1]. Our aim here is to replicate this cooperativity using salen complexes deposited onto an organized surface. To achieve this, we propose to take advantage of the ability of the 3,5-TSB (tri-(*E*)-styrylbenzene) to self-assemble onto graphene, creating a 2D monolayer as a honeycomb-like molecular sieve[2]. The pores formed in this system can host polyaromatic molecules[3], therefore, we intend to non-covalently deposit pyrene tagged catalysts[4] inside the pores. We will thus control the spacing between the catalysts as shown in figure 1, ensuring a good cooperativity between the active moieties.

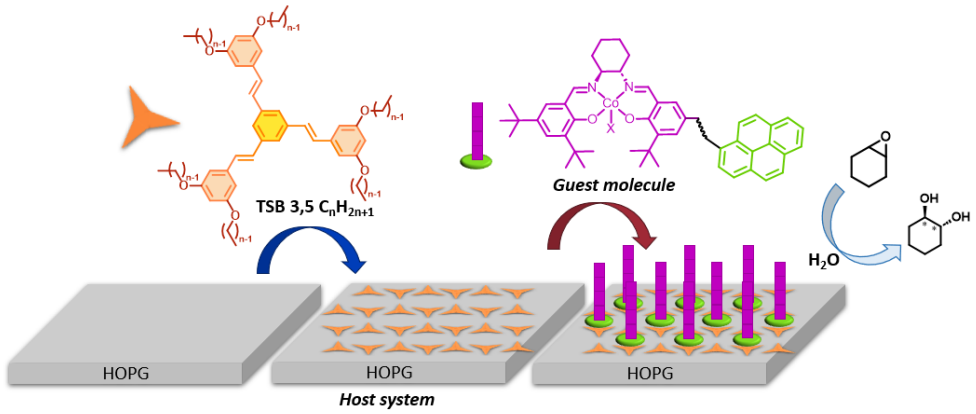

Figure 1. Hosting of pyrene-tagged Co-salen catalyst into the pores of the honeycomb system formed by the self assembly of TSB on graphene

References

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