HYPERPOSITIVE AND ENANTIODIVERGENT NON-LINEAR EFFECTS IN ASYMMETRIC CATALYSIS

Asymmetric amplification is a phenomenon that plays a key role in the emergence of homochirality in life. In asymmetric catalysis, theoretical and experimental models have been investigated to provide an understanding of how chiral amplification is possible, in particular based on non-linear effects for the individual reaction cycle. In the most remarkable cases, the degree of enantio-induction from a non-enantiopure catalyst was found to be as high as with an enantiopure reference system.

Interestingly, it has been proposed a quarter century ago that chiral catalysts, when not enantiopure might even be more enantioselective than their enantiopure counterparts, though such a case has never been observed to date. The latter effect amounts to an auto-correction of an “imperfect system” and would be of paramount interest for chemical evolution models.

We show here than such hyperpositive non-linear effect is indeed possible. This peculiar phenomenon is the starting point for mechanistic investigations, both theoretical and experimental, which lead to a new model that can account for non-linear hyperpositive -and also enantiodivergent- phenomena.

References:

Geiger *et al.*, *Nature Catalysis* **2020**, 422; *Chemical Science* **2020**, 12453; *Chirality* **2020**, 1250.