Accelerating the implementation of biocatalysis in industry

Despite enormous progress in protein engineering, complemented by bioprocess engineering, the revolution awaiting the application of biocatalysis in the fine chemical industry has still not been fully realized. In order to achieve that, further research is required on several topics, including (1) rapid methods for protein engineering using machine learning, (2) mathematical modelling of multi-enzyme cascade processes, (3) process standardization, (4) continuous process technology, (5) methods to identify improvements required to achieve industrial implementation, (6) downstream processing, (7) enzyme stability modelling and prediction, as well as (8) new reactor technology. In this brief mini-review, the status of each of these topics will be briefly discussed.