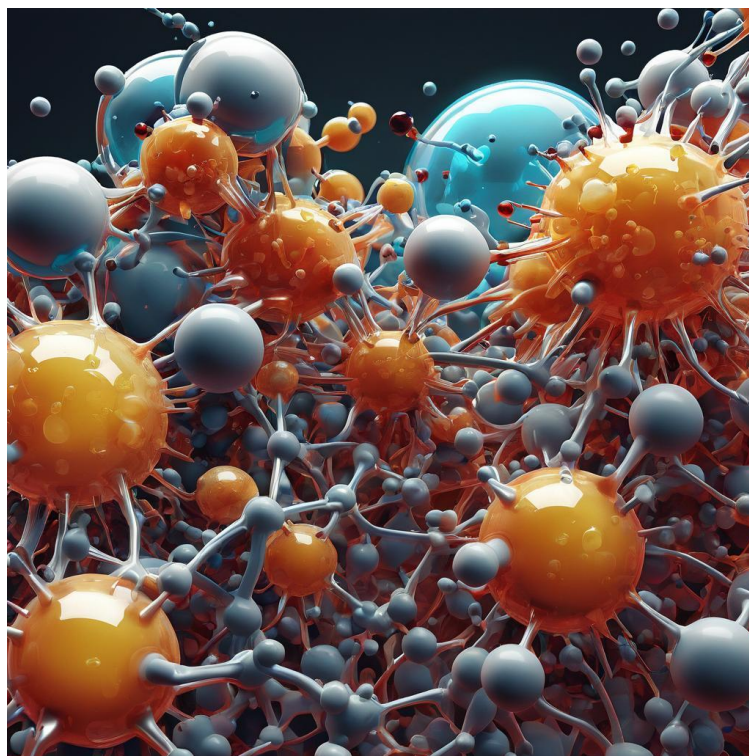


Enzyme-like Catalysts



Cytochrome-P450s are a class of biological enzymes with an iron porphyrin active site which catalyzes the addition of oxygen to a substrate. The most important representation of this class of reactions is the insertion reaction: $\text{R-H} + \frac{1}{2} \text{O}_2 \longrightarrow \text{R-OH}$

Such reactions are imperative for the elimination of harmful hydrophobic compounds such as steroid precursors and pesticides. This reaction is of great interest to many industries, in particular the petroleum industry, which produces thousands of tons of alkanes per annum. These industries have a limited usage for alkanes and they are therefore compounds of low value. Thus, companies like Sasol are interested in the partial oxidation of alkanes, which will produce fine chemicals of high value such as alcohols, ketones and aldehydes.

Intensive research has been undertaken during the past few decades using synthetic iron porphyrins as models of the Cytochrome-P450 enzymes. A large amount of success has been achieved using porphyrins with good turnover rates, yields and selectivity on an industrial scale. Phthalocyanines have the same chemical behaviour as the naturally occurring porphyrins, with an added advantage of stability and ease of production. We plan to study the effects of different peripheral substituents and central metals in phthalocyanines on the activity of these catalysts.

