

Fe-gekataliseerde alkeenoksidasie: Effek van steriese en elektroniese parameters op nieheemoksidase-aktiwiteit



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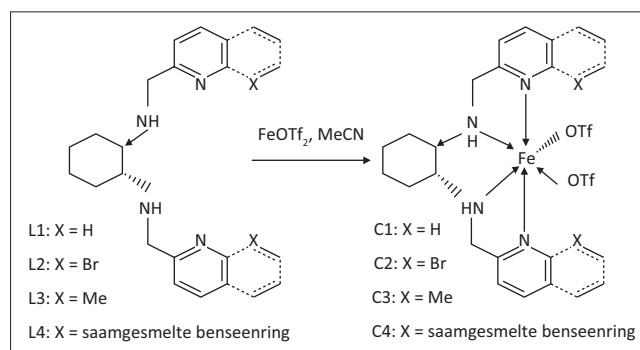
Fe catalysed alkene oxidation: Effect of steric and electronic properties on non-heme oxygenase activity. The oxidation of C-H bonds is an important transformation in organic synthesis. A range of (*R,R*)-bis-heterocyclic diamine ligands and their corresponding Fe(II) complexes were synthesised and characterised. These complexes were evaluated as catalysts in the oxidation of *cis*-cyclooctene. This substrate was selectively oxidised to cyclooctene epoxide.

Koolstof-heteroatoom- (C-X) bindings is algemeen in organiese verbindings wat as boustene in die chemiese en farmaseutiese industrie gebruik word (Correa, Mancheño & Bolm 2008). Die fokus is tans op die transformasie van koolwaterstowwe (alkane en alkene) van verskillende bronne soos olie en natuurlike gas (Derouane et al. 2006). Deur hierdie alkane en alkene te transformeer, kan nuwe paaie na meer waardevolle produkte ontdek word. Produkte wat gevorm kan word, sluit in aldehiede, alkohole, ketone, epoksiede en *cis*-dirole (MacLeod et al. 2010). Vanweë die verskillende toepassings van hierdie produkte, is die fokus om 'n katalisesisteam te vind wat 'n wye reeks van organiese substrate kan oksideer en funksionaliseer.

Die natuur het die probleem van selektiewe C-H-oksidasie opgelos deur gebruik te maak van ensieme. Hierdie ensieme dien as 'n inspirasie vir chemici en kan as 'n bloudruk gebruik word om soortgelyke verbindings in die laboratorium te sintetiseer. Alhoewel daar baie belangstelling in dié reaksies is, het die katalisesisteme wat geraporteer is, 'n paar beperkings. Van die belangrikste en algemeenste probleme van hierdie oksidasie-reaksies is die lae produkselektiwiteit sowel as die swak regio- en stereoselektiwiteit (Bordeaux, Galarneau & Drone 2012).

Die gebruik van omgewingsvriendelike reaksietoestande word al hoe belangriker en die fokus is daarom die ontwikkeling van 'n chemies effektiewe atoom-, energie- en oksidasieproses om alkane en alkene te transformeer (Fernandes et al. 2011).

'n Stel van chirale *R,R*-bis(heterosikliese)diamienligande en hul Fe(II)-triflaatkomplekse (Figuur 1) is voorberei. Hierdie komplekse is met 'n verskeidenheid van spektroskopiese en analitiese tegnieke gekarakteriseer. Dit sluit in KMR (¹H, ¹³C), MS, UV-Vis-spektroskopie en elementalanalise. Na die sintese van die gewenste komplekse, is dit geëvalueer as katalisatore in die oksidasie van *cis*-siklo-okteen. Die substraat word selektief na siklo-okteenepoksied geoksideer.



FIGUUR 1: Fe(II)-bis(heterosikliese)diamien komplekse om as katalisatore te evalueer.

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Note: A selection of conference proceedings: Student Symposium in Science, 27–28 October 2016, North-West University, South Africa. Organising committee: Mr Rudi Pretorius (Department of Geography, University of South Africa); Dr Hertzog Bisset (South African Nuclear Energy Corporation [Necsa]); Dr Andrew Swarts (School of Physical and Chemical Sciences, North-West University).

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