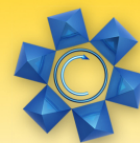


Vanadium Catalyzed Disassembly of Lignocellulose



ConvEne IGERT

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Due to the escalating global energy demand and diminishing petroleum reserves, a driving interest in the production of biorenewable chemicals and fuels has emerged. Lignocellulose is an important nonfood-based resource, however breakdown of the highly functionalized polymers lignin and cellulose for use in biofuels and chemical applications is a major challenge. Developing new metal catalyzed aerobic oxidative C–C bond cleavage reactions could provide new pathways for chemical intermediates from cellulose and lignin. Supported vanadium catalysts have been extensively investigated as interesting catalytic materials and have high commercial potential as oxidation catalysts in several industrial processes. My approach to break down lignocellulosic biomass involves a heterogeneous catalyst derived from the immobilization of a discrete vanadium complex in a mesoporous silica matrix. In addition to providing a means of catalyst recycling and opportunities to alter catalyst activity and selectivity, supported vanadium materials may provide additional insight into the mechanism of oxidation.



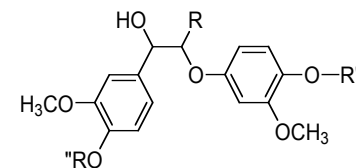
forest residue



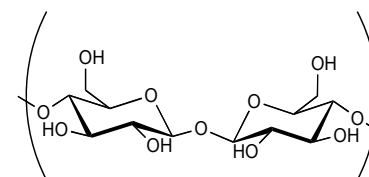
switchgrass



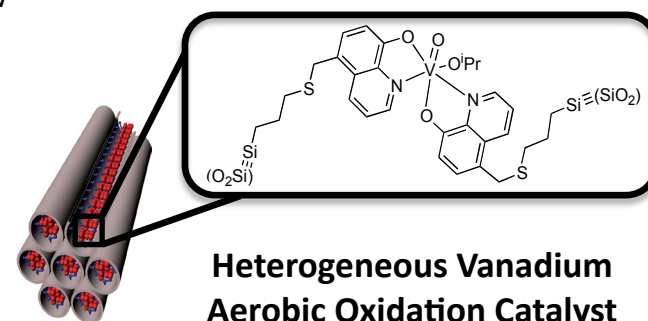
corn stover,
straw



lignin subunit



cellulose subunit



**Heterogeneous Vanadium
Aerobic Oxidation Catalyst**