EPFL-TTO

EPFL Innovation Park J
CH-1015 Lausanne
Switzerland
+41 21 693 70 23
http://tto.epfl.ch/

Research Contact

Prof. Paul Dyson
+41 21 693 98 54
paul.dyson@epfl.ch

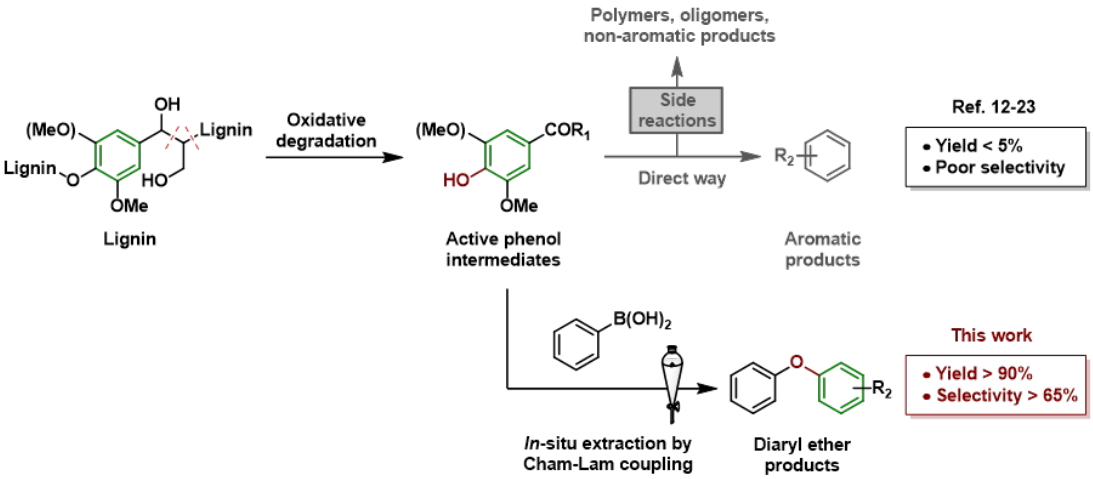
TTO Contact

Dr. Adam Swetloff
+41 21 693 37037
adam.swetloff@epfl.ch

Licensing Opportunity

TTO – Technology Transfer Office

Synthesis of Functionalized Diaryl Ethers from lignin



The figure describes the current catalytic oxidative degradation approach and the proprietary method using Chan-Lam coupling(highlighted in red).

Ref. Nr

6.2318

Keywords

Lignin, diaryl ether compounds, green chemistry, pharmaceutical

Intellectual Property

Priority: EP22178410.1

Publications

Liu, M., Dyson, P.J. Nature Communications (2023) https://doi.org/10.1038/s41467-023-38534-1

Date

24/05/2023

Description

Lignin is a complex aromatic biopolymer present in plant cell walls which represents a sustainable source of aromatic compounds as an alternative to fossil-derived feedstocks. It is currently available in abundant quantities as a waste product from the pulp and paper and bioethanol industries.
Oxidative depolymerization is frequently applied to lignin to generate phenolic monomers. However, due to the instability of intermediates, repolymerization and dearylation reactions lead to low selectivity and product yields.
The technology provides a highly efficient strategy to extract the aromatic monomers from lignin affording functionalized diaryl ethers using Chan-Lam coupling, which overcomes the limitations of oxidative methods and affords high-value specialty chemicals.

Advantages

The method converts lignin into stable diaryl ether products in near-theoretical maximum yields (92% for beech lignin and 95% for poplar lignin based on the content of β-O-4 linkages).
The method suppresses side reactions typically encountered in oxidative depolymerization reactions of lignin and enables the direct transformation of lignin into valuable functionalized diaryl ethers, including key intermediates used in pharmaceutical and natural product synthesis as well as a range of new products.

Applications

- Pharmaceutical and agrochemical chemistry
- Use of diaryl ether compounds as precursors in organic synthesis