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РЕАКЦИИ ЭЛЕКТРОФИЛЬНОГО И НУКЛЕОФИЛЬНОГО ЗАМЕЩЕНИЯ ЛИГНОСУЛЬФОНАТОВ КАК ОСНОВА ПЕРСПЕКТИВНЫХ НАПРАВЛЕНИЙ ПЕРЕРАБОТКИ ДРЕВЕСИНЫ

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Несмотря на то, что лигносульфонаты являются предметом исследования технологии производства целлюлозы, которая утрачивает свое ведущее место в общем списке производств волокнистой массы, достижения, связанные с использованием лигносульфонатов, позволяют полностью вовлечь этот продукт в переработку.

Цель работы — анализ современных направлений модифицирования лигносульфонатов с учетом их реакционной способности, обобщение перспектив расширения областей применения лигносульфонатов и их производных.

Маркетинговый прогноз по промышленному использованию лигносульфонатов показывает непрерывно увеличивающийся интерес к этому продукту. Некоторый спад публикаций с исследованиями, связанными с лигносульфонатами, завершился примерно десять лет назад. Так как в основе лигносульфонатов лежит фенилпропановая единица, то наиболее часто в способах модифицирования рассматриваются реакции замещения атомов водорода в ароматическом кольце. Сульфогруппа в лигносульфонатах является достаточно прочно связанной с пропановой цепью и поэтому работ в этом направлении проводится значительно меньше. Еще одним реакционноспособным центром в молекуле лигносульфонатов является фенольный гидроксил, водород которого способен вступать в реакции нуклеофильного замещения. В статье рассмотрена реакционная способность лигносульфонатов в реакциях электрофильного и нуклеофильного замещения: нитрования, нитрозирования, сульфирования, галогенирования, ацилирования, меркурирования, окисиметилирования, азосочетания, карбоксиметилирования, оксипропилирования. Обсуждены экологические последствия применения лигносульфонатов. Приведены многочисленные примеры применения лигносульфонатов по новым направлениям в фармации, производстве ионных жидкостей, суперконденсаторов, синтезе сополимеров, антикоррозионных присадок, пищевой упаковки, антипиренов.

Ключевые слова: лигносульфонаты, электорфильное и нуклеофильное замещение, нитрование, нитрозирование, сульфирование, галогенирование, ацилирование, меркурирование, окисиметилирование, азосочетание, карбоксиметилирование, оксипропилирование, производные лигносульфонатов и их свойства.

ELECTROPHILIC AND NUCLEOPHILIC SUBSTITUTION REACTIONS OF LIGNOSULFONATES AS THE BASIS FOR PROMISING DIRECTIONS FOR WOOD PROCESSING

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Despite the fact that lignosulfonates are the subject of research in pulp production technology, which is

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losing its leading place in the general list of pulp production, advances associated with the use of lignosulfonates make it possible to fully involve this product in processing.

The aim of the work is the analysis of modern directions of lignosulfonates modification taking into account their reactivity, generalisation of perspectives of expansion of application areas of lignosul-fonates and their derivatives.

The marketing forecast for the industrial use of lignosulfonates shows a continuously increasing interest in this product. The decline in lignosulfonate-related research publications ended approximately ten years ago. Since lignosulfonates are based on a phenylpropane unit, the modification methods most often involve substitution reactions of hydrogen atoms in the aromatic ring. The sulfonic group in lignosulfonates is quite tightly bound to the propane chain and therefore much less work is being done in this direction. Another reactive center in the lignosulfonate molecule is the phenolic hydroxyl hydrogen, which is capable of undergoing nucleophilic substitution reactions. The article examines the reactivity of lignosulfonates in reactions of electrophilic and nucleophilic substitution: nitration, nitrosation, sulfonation, halogenation, acylation, mercuration, oxymethylation, azo coupling, carboxymethylation, oxypropylation. The environmental consequences of the use of lignosulfonates are discussed. Numerous examples of the use of lignosulfonates in new areas in pharmacy, the production of ionic liquids, supercapacitors, the synthesis of copolymers, anti-corrosion additives, food packaging, and fire retardants are given.

Keywords: lignosulfonates, electrotrophilic and nucleophilic substitution, nitration, nitrosation, sulfation, halogenation, acylation, mercurisation, oxymethylation, azo-coupling, carboxymethylation, oxypropylation, lignosulfonate derivatives and their properties.

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