Área: ELE

ELECTROCATALYTIC REFORM OF LIGNIN IN ALKALINE SOLUTION: THE EFFECT OF NANOSTRUCTURATION OF COBALT ELECTRODES

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Highlights

Electrochemical activity as a function of the morphology.

Surface area control by electrochemical deposition.

Optimal electrode area

Resumo/Abstract

Kraft lignin is a known pulp and cellulose by-product. This macromolecule can be oxidized, generating monoaromatic chemical products and, if the oxidation process is electrochemical, also producing H_2, a high energy density fuel. For the electrochemical lignin oxidation, alkaline electrolytes are needed, so the macromolecule can be soluble in aqueous media. In this work, Cobalt (Co) was selected as electrocatalyst, since it has a low cost and is stable in alkaline media. Another advantage of Co is that this catalyst has a high selectivity not only for aldehyde products, but also specifically for vanillin, which is unexpected and not understood by the literature. For this reason, it is proposed to systematically investigate Coelectrochemical behavior for kraft lignin oxidation. To carry out the study, Co electrodeposition was selected to synthesize the catalyst, since this is a low cost process and easy to control. After that, the obtained electrodes were tested for lignin oxidation and mass transport influence was found, due to the peak current linearization against sweep rate. Changing the deposition conditions, the electrode roughness also changed. Checking the activity of these different electrodes, it was found that there is an optimal surface area for this reaction.

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