

Infrared spectrum of residues formed in the process of biofuel production before and after oxidation within the electrochemical generator

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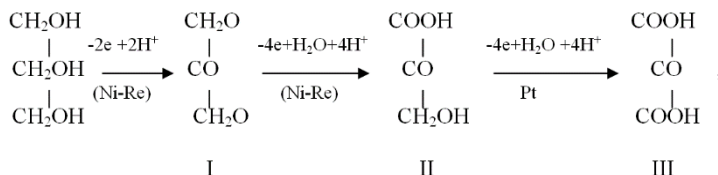
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Biofuel production has increased throughout the world, which had been caused both by low price (it is 1,5 times cheaper than fuel) and its environmental friendliness; a microorganism processes 99% of fuel per month.

We have examined residues formed before and after biofuel generation not only as a source of power production, but as compounds, which in the process of electro-oxidation turn into substances possible for future use in different operations.

Previously residues were examined on a chromatographical basis. Electro-oxidation was performed in a usual glass cell with parted anode and cathode chamber in 7 M KOH. Pt and Ni-Re were involved as an anode, and spinel NiCo₂O₄ was used as a cathode. The “skinning” method (glass KRS-5, spectrometer - Spekord) was applied for removal of infra-red spectrum. The residues under examination are characterized by a broad absorption band in the range of 2900-3500 cm⁻¹ and less intensive absorption band 15600-1540 cm⁻¹, 1410-1380 cm⁻¹, which alongside with chromatographical researches allowed to define the residues under examination as glycerin (98%), containing esters of methyl and ethyl acid.



After having been oxidized infra-red spectrum is characterized by a sharp change of the absorption band in the range of 2900-3500 cm⁻¹, appearance of a narrow band 1700-1730 cm⁻¹ and intensity of lines in the range of 800-1400 cm⁻¹. The research, we have conducted, allowed to establish the following scheme of transformation of residues over catalysts Ni-Re and Pt, as well as to determine that residues formed after biofuel generation can be used in an electrochemical generator (7M KOH; T=333-353; I=10 mA/ cm²) and can serve for obtaining products applied in the industry (I – oxy-2- propanol – a solvent medium for cellulose nitrate; an ingredient of tanning lotions, emulsifiers, an accelerant for ester synthesis; II – pyroracemic acid, used in biochemical researches; III – ketomalonic acid – an accelerant in organic synthesis).