SUMMARY OF NEW CONCLUSIONS OF PhD THESIS

Title: "**synthesis, characteristic of acid catalysts based on carbon from biomass and graphene oxide applied to lactic acid esterification**"

Specialty: Theoretical Chemisty and Physical

Chemistry Code: 9.44.01.19

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Scientific instructors:

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New conclusions

1. The appropriate conditions for the synthesis of solid acid based on sulfonated carbon (CS) made from such sources of biomass as sawdust, straw, bagasse, husk, water hyacinth, corn and cassava were studied and determined systematically. As a reasult, the sulfonated carbon catalyst made from sawdust (CS.Mc) has the highest amount of acid groups $–SO_3H$ with the specific surface area to be 1,14 mmol/g and 423,4 m^2/g, respectively. This catalyst was suitable for the esterfication reaction of lactic acid into ethyl lactate applied as a bio-solvent.

2. The catalysts based on graphene oxide (GO) and GO supported on activated carbon (GO/AC) were synthesized, characterized and their catalytic activity were evaluated with the esterfication reaction of lactic acid into ethyl lactate. The results showed that forming efficiency of ethyl lactate achieved 51% after 7 hours of reaction time with only 1% weight of GO in comparison to lactic acid. Especially, using GO/AC catalyst with the weight ratio of GO/AC of 1/10 corresponding to

1% weight of GO in comparison to lactic acid made it easier to remove the catalyst from the mixture forming after the reaction and forming efficiency of ethyl lactate achieved 34,5% corresponding to CS.Mc catalyst with 5% wt of CS.Mc in comparison to lactic acid.

3. A bio-solvent including ethyl lactate was prepared and applied for making 2 plant protection products named Biosol-D 2.5EC (including deltamethrin) and Biosol-Ch 20EC (including chloropyrifos ethyl). As a reasult, biological effects of Biosol-D 2.5 EC were equivalent to the similar product named Videcis 2.5 EC prepared from a fossil solvent.

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