附件 6

中国科学院大学
University of Chinese Academy of Sciences

硕士学位论文评阅书

论文题目 Synthesis of Renewable High-Density Dicycloalkanes with Methyl Benzaldehydes and Acetone

作者姓名 ADEREMI TIMOTHY ADELEYE

学位类别 Master of Science

学科（专业）Industrial Catalysis

研究所（院系） Dalian Institute of Chemical Physics

中国科学院大学制

硕士学位论文专家评阅意见

评阅意见（包括论文选题的理论意义和应用价值；文献资料的掌握；论文取得的成果及水平；写作规范化、逻辑性等。还须明确指出论文中存在的问题和不足之处。可另附页）

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See the attachment.

论文总体评价 （请在相应栏内划"√"）	□优秀	√良好	□中	□差
是否同意组织学位论文答辩 （请在相应栏内划"√"）	☑同意答辩	☑修改后答辩		□不同意答辩

1. Page 26, chapter 2, It would be better to add the latest research progress on the strategy of producing naphthenes with methyl benzaldehyde by aldol condensation reaction, which is the closest strategy to the topic of dissertation.

2. In order to make the chapter 1 logical, it is recommended to move chapters 1.3 and 1.4 to the page 6, before the sentence of "For aviation,... ".

3. On page 44, please use symbols to express the equations. For example, use "$n_{\text{methyl benzaldehyde in the feedstock}}$" to replace "the moler of methyl benzaldehyde in the feedstock".

4. In Figure 4.3, on page 44, please use the mass spectrum signal to plot and indicate the Mass/charge used.

5. In Scheme 2.2 and 2.3, on page 25, please normalize the molecular formula drawn in the figure.

6. On Page 43, when 1A and 2A appear for the first time, they should be capitalized, and the name of the compound should be given.

7. On Page 8, it is recommended to divide the biofuel into two generations according to whether the feedstocks are edible.

8. On Page 8, it is recommended to divide the preparation methods of biomass fuel into three categories: "biochemical route, thermochemical route and platform compounds route".

9. Other format issues:

On Page 2, "NOx, SOx" should be "NO_x, SO_x" ;

On Page 14, the font of "To investigate ...." should be one size larger;

On Page 15, the symbol '' should be "; P23, "said" should be "acid";

On Page 36, please redraw reaction equation 2.2.1 and 2.2.2;

On Page 39, "P-methyl benzaldehyde, O-methyl benzaldehyde" should be "*p*-methyl benzaldehyde (97%), *o*-methyl benzaldehyde";

On Page 60, "TiO6" should be "TiO_6".

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Comments on dissertation for Aderemi Timothy Adeleye

The master candidate studied synthesis of high-density dicycloalkanes with methyl benzaldehydes and acetone via cascade reactions which take place over titania and Pd/C catalysts consecutively. High selectivity of target product up to 90.8-92.8% was obtained over the PTNT and Pd/C under optimal conditions. This study may provide good reference for producing high quality jet fuels in convenient ways.

Here, some questions were listed for authors' consideration to improve the dissertation.

1. The authors listed the quantitative analysis results of acid sites amounts in Table 4.2. The acid sites number over PTNT was 22 times higher than TiO2 P25, and 18 times higher than PTNW. However, from the NH3-TPD profiles (Figure 4.3), the discrepancy between the acid site amounts over PTNT and TiO2 or PTNW should not be such large. Please double check the data and NH3 desorption profiles. (Page 49)

2. The author attributed the activity of PTNT higher than TiO2 to the presence of surface Bronsted acid sites on the former (Pag 51). However, this may conflict the results over PTNW. From NH3-TPD profile of PTNW, it can be known that considerable amount of strong acid sites were present (highly possibly belonging to Bronsted acid sites), but its activity was even lower than that of TiO2 P25. Could the author give more explanation to this point?

3. As far as I know that PTNT has been applied as a catalyst for condensation reaction previously. Could the author give comparison between this study and the previous one? More discussion on this point may highlight the progress and novelty of this study.

4. One minor suggestion: the abstract should be more concise.

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所选题课题意义重大，符合国家重大能源战略需求。文献资料掌握比较充分，并取得一定成果。满足并符合答辩标准。

文中英文写作水平需要进一步提高，有些部分过于口语化，文献格式需进一步整合和修改。

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生物质催化转化制液体燃料是实现社会可持续发展和绿色能源的重要研究方向。该学位论文以生物基丙酮和甲基苯甲醛为底物，以钛酸类固体酸为催化剂，通过高效羟醛缩合反应以及HDO反应制备双环烷烃化合物燃料，具有重要理论意义和应用价值。增链反应和HDO反应收率分别达70%和90%，双环产物具有高密度和低凝点，论文具有创新性，研究内容工作量大，结构清晰，英文撰写规范，结论可信，表明作者具有较深的基础知识和独立从事科学研究的能力。建议作者从技术经济性角度提出一些展望。

综上所述，该生学位论文达到工学硕士论文要求，建议答辩。

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In this paper, the catalytic performance of different protonated titanate based materials for the synthesis of renewable aviation kerosene oxygen-containing precursors was systematically investigated by using acetone and methylbenzaldehyde as raw materials, and further hydrodeoxygenation was carried out to obtain bicyclic alkanes in aviation kerosene range. This paper has theoretical significance and application value. The literature review is comprehensive and systematic. The experimental design is reasonable and the conclusion is correct. But the paper has the following problems:

(1) The first paragraph of the abstract is too long and needs to be refined.

(2) In the third paragraph of the abstract, specific conditions should be given under "optimal conditions"

(3) What is the oxygen-containing precursor of aviation kerosene in the abstract? The name of the compound should be given clearly.

(4) Recheck the format of the paper. For an example, there is no space at the beginning of a paragraph, P5, p15, 16, 18, 33

(5) Table 2.1 needs to be modified, and the column "brief notes" needs to be modified

(6) In p44 data evaluation part, the calculation formulas of conversion and yield need to be simplified

(7) In the section of result and discussion, it is necessary to explain why nanotubes, nanowires and nanosheets are formed and how to control accurately to generate them?

(8) Under the optimized reaction conditions, Besides 1A , 1AII and 1AIII, what are another products?

(9) With the reaction time going on, why did not 1A further reacts to form 1AII?

(10) The format of references needs to be corrected, some are marked with page number, some are not marked?