

Information on Doctoral thesis of Fellows Nguyen Thi Lua

1. Full name: Nguyen Thi Lua

2. Sex: female

3. Date of birth: 27/2/1984

4. Place of birth: Nam Dinh

5. Admission decision number: 3614/SDH Dated: October 22th 2009 by the President of Vietnam National University, Hanoi

6. Changes in academic process: None

7. Official thesis title: Study on syntheses, characteristics and applications of nano-sized Cu₂O

8. Major: Inorganic chemistry

9. Code: 62.44.25.01

10. Supervisors:

Assoc.Prof. Dr Trieu Thi Nguyet

11. Summary of the new findings of the thesis

- The effects of the reaction conditions on the formation of nano-sized Cu₂O powder were systematic investigated: the nature and the amount of stabilizer, the amount of reducing agent, KOH concentration and the reaction temperature. Since then, the optimum reaction conditions are advanced.

- The effects of the reaction condition on the catalytical ability of Cu₂O nanoparticles in polymerization reaction acetylene gas to synthesize CNF were systematic investigated: the reaction time, the reaction temperature, the acetylene flow rate. Since then, the optimum reaction conditions are advanced.

- Cu₂O thin films on glass substrate were successfully fabricated by CVD method using Cu(acac)₂ precursor and different reacting agents: ethanol-water vapor, water vapor and water-hydrogen peroxide vapor from simple equipments, conformity with condition of laboratory in Viet Nam: temperature range of 240-300^oC, pressure about 160 mmHg. In there, ethanol-water and water-hydrogen peoxide reacting agents are not mentioned by any authors. The obtained thin films was uniform, had good quality and absorbed strongly wavelengths in range 300-600 nm (visible region). Band gap of Cu₂O thin films were collected from UV-Vis and PL methods ($E_g = 2.2-2.6$ eV).

12. Practical applicability:

The optimum reaction conditions for synthesizing nano-sized powder of Cu_2O were found. The nano-sized powder of Cu_2O had good catalytic activities for the polymerization reaction of acetylene to produce CNF. Successfully fabricating Cu_2O thin film on glass substrate by CVD method using copper(II) acetylacetonate complex precursor. The obtained results of the thesis are expected to open newly potential applications of Cu_2O thin film in solar cell field. This is the way aiming the basic studies at the practical applications.

13. Further research directions

- Further investigation in to catalytical ability of nano-sized Cu_2O powder in order to practical apply in environment treatment.
- Further investigation in to characteristic of fabricated the thin films in order to direct into practical applications in hight technology.

14. Thesis-related publications:

- Trieu Thi Nguyet, Nguyen Thi Lua, Do Huy Hoang (2010), "Study on influence of some factors on methyl orange degradation process using catalytic of cuprous oxide nano", *Journal of chemistry* Vol.48(4A), pp.125-129
- Trieu Thi Nguyet, Nguyen Thi Lua, Pham Xuan Hung, Nguyen Hung Huy (2011), " Synthesis and study on using of copper(II) pivalate for manufacture of Cu_2O thinfilm by CVD technique", *Journal of chemistry* Vol.49(3A), pp.105-109.
- Trieu Thi Nguyet, Nguyen Thi Lua, Nguyen Manh Hung, Nguyen Hung Huy (2011), "Study on influence of some factors on formation process of Cu_2O thinfilm using copper(II) acetylacetonate complex", *Journal of chemistry* Vol.49(3A), pp.111-115.
- Trieu Thi Nguyet, Nguyen Thi Lua, Nguyen Manh Hung, Nguyen Hung Huy (2011), "Study on the fomation ability of Cu_2O thin film from copper(II) acetylacetonate by CVD technique", *Journal of Analytical Sciences* Vol.16(1), pp. 20-24.
- Trieu Thi Nguyet, Nguyen Thi Lua, Nguyen Hung Huy (2011), "Investigation of catalytic activity of nano-sized Cu_2O in the vapor growth carbon fibers from axetilene", *Journal of Analytical Sciences* Vol. 16(3), pp. 47-50.
- Trieu Thi Nguyet, Nguyen Thi Lua, Nguyen Thu Huong, Nguyen Van Quyen, Nguyen Hung Huy (2011), "Estimating dye degradation catalytic activity of cuprous oxide nano ", *Journal of Analytical Sciences* Vol.16(4), pp. 23-26.
- Trieu Thi Nguyet, Nguyen Thi Lua, Nguyen Hung Huy (2012), "Investigating the effect of some factors on fabrication of carbon fiber using nano-sized cuprous oxide catalyst", *Journal of Analytical Sciences* Vol. 17(2), pp. 60-65.

- Trieu Thi Nguyet, Nguyen Thi Lua, Pham Anh Son, Nguyen Hung Huy (2012), "Synthesis and characterization of $\text{Cu}_2\text{O}/\text{CdO}/\text{Glass}$ thin films", *Journal of Analytical Sciences* Vol.17(3), pp. 7-9.
- Nguyen Thi Lua, Trieu Thi Nguyet, Nguyen Manh Hung, Nguyen Hung Huy (2012), "The effect of temperature on the phase composition and physical properties of Cu_2O thinfilm fabricated by CVD method from copper(II) acetylacetonate and reacting agent of water-hydropeoxide vapor", *Journal of chemistry* Vol.50(5B), pp.283-287.
- Nguyen Thi Lua, Trieu Thi Nguyet, Nguyen Manh Hung, Nguyen Hung Huy (2012), "The effect of temperature on the phase composition and physical properties of Cu_2O thinfilm fabricated by CVD method from copper(II) acetylacetonate and reacting agent of water vapor", *Journal of chemistry* Vol.50(5B), pp.288-292.
- Nguyen Thi Lua, Trieu Thi Nguyet, Nguyen Hung Huy (2012), "The role of stabilizing agent of polyvinylalcohol on the fabrication of Cu_2O nano particles", *Journal of chemistry* Vol.50(5B), pp.293-297.