

## Information on Doctoral thesis of Fellows Nghiem Xuan Truong

1. Full name: Nghiem Xuan Truong
2. Sex: Male
3. Date of birth: 22/10/1968
4. Place of birth: Ha Tay
5. Admission decision number: 150/SĐH dated July 7, 2005 from Ha Noi National University
6. Changes in academic process:
7. Official thesis title: Research in using of coal fly ash for dioxin analysis and distinguish dioxins from some different emission sources
8. Major: The Environmental Chemistry
9. Code: 62 44 41 01
10. Supervisors: Prof.Dr. Nguyen Duc Hue

Assoc.Prof.Dr. Do Quang Huy

### 11. Summary of the new findings of the thesis

- For the first time it has been suggested the adsorption of 17 toxic dioxin/furan congeners (PCDD/ PCDF) in zeolites. Has been used the method of alkaline hydrothermal treatment in order to produce the adsorbent from coal fly ash from Pha Lai thermal-power plant. In the different experimental conditions has produced 27 adsorbents. Studied and defined two out of 27 adsorbents had the best adsorption capacity for PCDD/PCDF, which are FAP(M)32-3,5(7-1) and FAP(M)48-4,5(5-1).

- First time the sample preparation procedures in dioxin analysis have been improved, in which using the adsorbent from alkali-treated coal fly ash from thermal-power plant to adsorb PCDDs/PCDFs. Has been developed two sample preparation procedures using the two adsorbents from alkali-treated coal fly ash which had the best adsorption capacity for analyzing dioxins/furans in the environmental samples (soil, sediment) and biological samples (fish, meat). The parameters of these two procedures including detection limits of the method, accuracy and precision of the analyzing results, recovery of internal standards ... satisfied all criteria of a method of US. Environmental Protection Agency for analyzing dioxins/furans on gas chromatography/low resolution mass spectrometry.

- Studied and found out the principle to differentiate dioxin from herbicides containing 2,4,5-T and dioxin emissions from some other source based on 3 main parameters: the percentage ratio of 2,3,7,8-TCDD in TEQ of 17 toxic dioxin/furan congeners in the sample (T%), the ratio of concentration of the two most toxic dioxin congeners is 1,2,3,7,8-PeCDD and 2,3,7,8-TCDD (P), and the ratio of total concentration of toxic

congeners of polychlorinated dibenzo-p-dioxins and total concentration of toxic congeners of polychlorinated dibenzofuran (R). Dioxin from herbicides containing 2,4,5-T have the following values  $T > 50\%$ ,  $P < 1$  and  $10 < R < 40$ .

#### 12. Practical applicability, if any:

- The absorbent synthesized from alkali-treated coal fly ash discharged by Pha Lai thermal-power plant can be used as substitution for expensive absorbents (activated carbons, silica...) to improve the sample preparation procedures for analyzing 17 toxic dioxin/furan congeners in soil, sediment and biological (fish, meat) samples on gas chromatography/mass spectrometry, that is required more and more.

- The values T%, P and R from the analyzing result of 17 toxic PCDD/PCDF congeners in the sample help us differentiate whether dioxin/furan pollution caused by dioxin-contained toxic chemical or industrial activity, domestic activity, thereby the managers will make reasonable policies, determine the right source of dioxin pollution in the environment and take suitable measures.

#### 13. Further research directions, if any

- Continue to study the application of the absorbent synthesized from coal fly ash as the absorbent to be used in the sample preparation procedure for analyzing some other persistent organic pollutants (POPs).

- Study the capacity of absorbing dioxins/furans by pure zeolite and use them as absorbent on the sample preparation procedures for analyzing dioxin/furan and some other POPs.

#### 14. Thesis-related publications:

1. Nghiem Xuan Truong, Trinh Khac Sau, Nguyen Xuan Net, Nguyen Thanh Tuan, Do Thi Tuyet Nhung, Nguyen Duc Hue, Do Quang Huy (2007), "Evaluate capacity of using coal fly-ash from thermo power plan for dioxin analysis", *Journal of Analytical Sciences*, Vol.12, No. 4, pp: 42-46.

2. Do Quang Huy, Dam Quoc Khanh, Nghiem Xuan Truong, Nguyen Duc Hue (2007), "Produce absorbent material from coal fly ash using in environmental analysis; Part I. Produce absorbent material from coal fly", *Journal of Science, Natural Sciences and Technology*, Vol. 23, pp: 160 – 165.

3. Nghiem Xuan Truong, Trinh Khac Sau, Nguyen Xuan Net, Nguyen Thanh Tuan, Do Thi Tuyet Nhung, Nguyen Thi Thu, Nguyen Duc Hue, Do Quang Huy (2008), "Produce absorbent material from coal fly ash using in environmental analysis; Part II. Evaluate of using coal-fly ash from thermo power plan for dioxin analysis", *Journal of Science, Natural Sciences and Technology*, Vol. 24, No. 1S, pp: 211-215.

4. Truong NX, Sau TK, Net NX, Hung LB, Hue ND, Huy DQ, Hang NM (2010), "Study and differentiate dioxin from herbicide used in Viet Nam war and that created from other wastes", *Organohalogen Compounds*, 72, pp. 896-901.

5. Truong NX, Sau TK, Tuan NT, Dung NT, Thu NT, Hue ND, Huy DQ, Kien NT (2013), "Study, synthesize zeolite from coal fly ash of thermal power plant and evaluate their dioxin adsorption capacity", *Organohalogen Compounds*, 75, pp. 508-512.

6. Nghiêm Xuân Trường, Đỗ Quang Huy, Nguyễn Đức Huệ, Nguyễn Trung Kiên, Trịnh Khắc Sáu, Nguyễn Thị Thu Lý (2013), "Research on using alkaline coal fly ash as adsorbent in the cleaning process to analyze dioxin in soil and sediment samples", *Journal of Natural Sciences and Technology*, Vol. 29, No. 3S, pp: 114-121.