CURRENT SITUATION OF OF MATERIALS RESEARCH IN HCM CITY UNI. OF TECHNOLOGY, (HCMUT) VIETNAM

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WELCOME TO
HO CHI MINH CITY
UNIVERSITY OF TECHNOLOGY

1.1. GENERAL DESCRIPTION OF HCMUT

- one of the oldest and the most prestigious higher education institution in the South of Vietnam
- founded in 1911 by the French colonial administration
- subsequently named by:

'National Technical Center' in 1957,
'National Technical Institute' in 1972,
'Polytechnic University' in 1976, and

- by the present named HCMUT from 1993
- Nowadays, it constitutes one of three colleges of the "Vietnam National University of HoChiMinh City". The other two colleges are the College of Natural Sciences and College of Human Sciences

1.2. MAJOR ACTIVITIES

a) education and training of civil engineers and graduates at different levels up to Master and Ph.D.degrees;

b) scientific research and transfer of scientific and technological expertise and innovation to the enterprises and industries, and in general to the society,

c) collaboration with international partners for the high-level training and transfer of technology.

1.3. CAPACITIES

- composed of 11 faculties, 61 departments in total
- having 25.000 undergraduate students and about 1500 graduate students.

HCMUT FACULTIES:

1) FACULTY OF APPLIED SCIENCE
2) FACULTY OF CIVIL ENGINEERING
3) FACULTY OF CHEMICAL ENGINEERING
4) FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING
5) FACULTY OF INFORMATION TECHNOLOGY
6) FACULTY OF ENVIRONMENTAL ENGINEERING
7) FACULTY OF GEOLOGY AND PETROLEUM
8) FACULTY OF INDUSTRIAL MANAGEMENT
9) FACULTY OF MECHANICAL ENGINEERING
10) FACULTY OF MATERIALS TECHNOLOGY
11) FACULTY OF TRANSPORT

1.4. CLUSTER SYSTEM

- **Hardware view**

- Total system includes 01 Master node, 64 compute nodes. All nodes are used 2 links for communicating. The first link is Fast Ethernet for monitoring purposes. The second is Gigabit Ethernet for computing data.

- Computing node configuration

Dual Xeon 2.8GHz Hyper Threading; 1GB ECC DDRAM, 40GB HDD; 02 Gigabit Ethernet ports.

- Master node configuration

Dual Xeon 2.4GHz Hyper Threading; 2GB ECC DDRAM, 40GB HDD; 02 Gigabit Ethernet ports. 01 Fast Ethernet port.

- **Software view**

- The operating system on nodes is RedHat Enterprise Workstation 3.0.

-Compilers: Gnu C/C++, Fortran 77, Java. Version 3.2, Intel C/C++ , Fortran Compiler.

- For parallel programming, MPI libraries: LAM/MPI 7.0.4; MPICH 1.2.5.2; PVM 3.4.3-6

-- MATH and other libraries: BLAS, ATLAS, BLACS, LAPACK and SCALAPACK.

- The PBS queuing and Maui scheduler system to support user submitting their jobs.

- Applications: ANSYS, GAUSSIAN, MATLAB, WIEN2K, GULP, VSAP, …


WELCOME TO THE
FACULTY OF MATERIALS TECHNOLOGY

INTRODUCTION TO FACULTY OF MATERIALS TECHNOLOGY

HISTORY:

Founded in June 2001 by unifying three branches:

- **Polymer Materials and Silicate Materials from the Faculty of Chemical Engineering**
- **Metallic Materials from the Faculty of Mechanical Engineering**

FACILITIES:

- **building: block C4**
- **4 laboratories belongs to 4 departments and 1 central laboratory belongs to the faculty**
- **4 departments**
- **3 research centers: polymer materials research center, silicate materials research center and new materials research center**

DEAN BOARD:

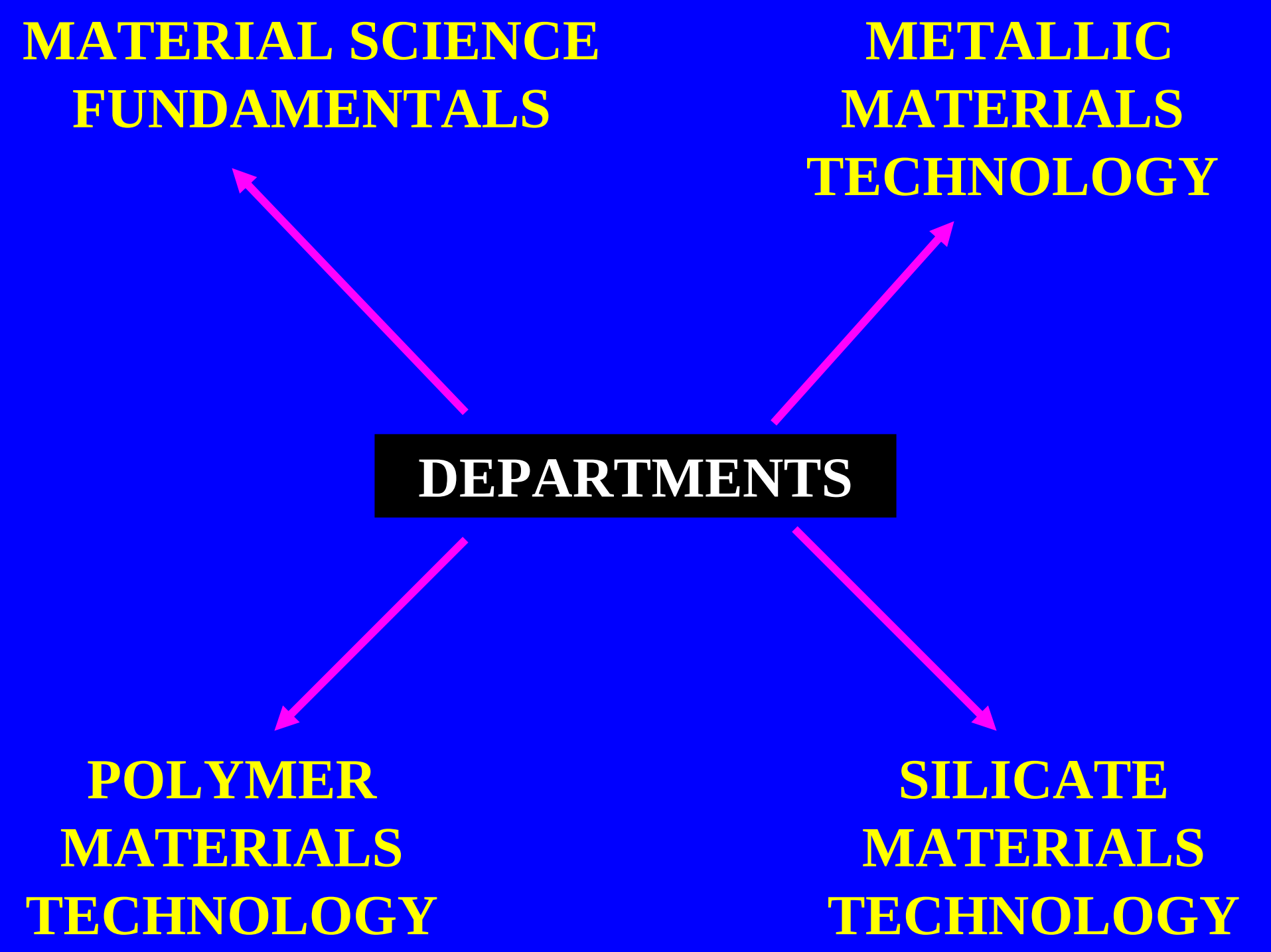
Dean: **M.Eng DO THANH THANH SON**

Vice Dean: **Dr. NGUYEN THANH LOC**

STAFF: (43 persons)

3 Professors, 10 Doctors, 11 M.Eng, 17 B.Eng

STUDENTS: (736 Students in total)


MATERIAL SCIENCE FUNDAMENTALS
METALLIC MATERIALS TECHNOLOGY
DEPARTMENTS
POLYMER MATERIALS TECHNOLOGY
SILICATE MATERIALS TECHNOLOGY

MATERIAL SCIENCE FUNDAMENTALS

STAFF:

01 Professor
05 Doctors
05 B.Eng

LAB: 02

Basic Material Science Lab.
Corrosion & Surface Treatment Lab.

RESEARCH ORIENTATIONS:

Advanced Materials
Corrosion protection & Electrochemical Engineering
Fuel Cells

METALLIC MATERIALS TECHNOLOGY

LAB: 01
Metallic Materials Technology

STAFF:
01 Professor
03 Doctors
04 M.Eng
05 B.Eng.

RESEARCH ORIENTATIONS:
- Sintered alloys
- Metallurgy
- Casting
- Heat treatment
- New materials

POLYMER MATERIALS TECHNOLOGY

STAFF:
01 Professor
01 Doctor
06 M.Eng
02 B.Eng.

LAB: 01
Polymer Materials Technology Lab.

RESEARCH ORIENTATIONS:

- Special Polymers
- Composite Materials
- High Performance Polymers
- Polymer Blend

3. Group of Computation

3.1. MEMBERS

Dr. Pham Thanh Quan, Faculty of Chemical Engineering
Dr. Nguyen Thanh Loc, Faculty of Materials Technology
MSc. Le Thanh Hung, Faculty of Chemical Engineering
Pham Ho My Phuong, PhD. stud., Univ. of Utah, USA
Nguyen Thanh Lam, PhD. stud., Univ. of Leuven, BEL.
Huynh Kim Lam, PhD. stud., Univ. of Utah, USA
Nguyen Giao Hoa, PhD. stud., Univ. of Utah, USA
Nguyen Kim Trung, Faculty of Chemical Engineering
Master Students

3.2. MAIN RESEARCH AREAS

- **Pollution in Atmosphere (atmospheric chemistry, combustion reactions …)**
- **Structures and properties of nanomaterials (nanotubes, nanowires, nanoparticles …) and catalyst (zeolite, homogenous and heterogeneous catalyst …)**
- **Properties of materials (metals, semiconductors, polymers, mineral oxides …)**
- **Structures and reactivity of organic/biological molecules**
- **Decomposition rules of substrates in mass spectrometry**

3.2. MAIN RESEARCH AREAS (ctn.)

- **Development and application of chemical reactivity indexes in explaining and predicting reaction mechanism by Density Functional Theory.**
- **Kinetics and Mechanism of polymerization reactions in gas phase, cycloaddition reactions, combustion reactions, hydrogenation and dehydrogenation reactions.**
- **Theoretical calculation of thermodynamic quantities such as equilibrium constants, reaction rates, heat of formation, proton affinity, electro-negativity …**
- **Process simulation and modellization**

International Cooperation

- **University of Leuven, Belgium, Prof. Nguyen Minh Tho, Prof. Arnout Ceulemans**
- **University of Brussels, Belgium, Prof. Paul Geerlings, Prof. Frank De Proft**
- **University of Hyderabad, India, Prof. Kalidas Sen**
- **University of North-Eastern Hill, Dr. Asit Kumar Chandra**
- **University of Utah, United States, Prof. Truong Nguyen Thanh**
- **University of Fisk, United States, Prof. Lawrence M. Pratt**

3.3. RECENT PUBLICATIONS (2002 – now)

1) A theoretical approach to the regioselectivity in 1,3-dipolar cycloadditions of diazoalkanes, hydrazoic acid and nitrous oxide to acetylenes, phosphaalkynes and cyanides.
Loc Thanh NGUYEN, Frank De PROFT, Van Luong DAO, Minh Tho NGUYEN and Paul GEERLINGS.
Journal of Physical Organic Chemistry, 2003, 16, 615 - 625.

2) Regio- and stereoisomeric composition of the product mixture in the Diels-Alder reaction of dicyclopentadiene with bicyclononadiene: a NMR and DFT quantum chemical investigation.
Monique BIESEMANS, Hassan DALIL, Loc Thanh NGUYEN, Bart HAELTERMAN, Ghislain DECADT, Francis VERPOORT, Rudolph WILLEM and Paul GEERLINGS.
Tetrahedron, 2002, 58, 10447 - 10453.

3) Local Softness versus Local Density of States as Reactivity Index.
Loc Thanh NGUYEN, Frank De PROFT, Montserrat Cases AMAT, Gregory VAN LIER, Patrick W. FOWLER and Paul GEERLINGS.
Journal of Physical Chemistry A, 2003, 107, 6837 - 6842.

4) Protonation and Methylation of Thiophenol, Thioanisole and their Halogenated Derivatives: Mass Spectrometric and Computational Study.
P. C. NAM, R. FLAMMANG, H. T. LE, P. GERBAUX and M. T. NGUYEN.
International Journal of Mass Spectrometry, 228, 151 - 165 (2003).

5) Molecular and Electronic Structure of Zwitterionic Diamino-Meta-quinonoid Molecules.
H. T. LE, P. C. NAM, V. L. DAO, T. VESZPREMI and M. T. NGUYEN.
Molecular Physics, 101, 2347 – 2355 (2003).

6) Density Functional Study of the Decomposition Pathways of Nitroethane and 2- Nitropropane.
P. A. DENIS, O. N. VENTURA, H. T. LE, M. T. NGUYEN.
Physical Chemistry Chemical Physics, 5, 1730 – 1738 (2003).

7) 1,4 Nitromethane – Methyl Nitrite Rearrangement: A Persistent Discrepancy between Theory and Experiment.
M. T. NGUYEN, H. T. LE, B. HAJGATO, T. VESZPREMI and M. C. LIN.
Journal of Physical Chemistry A, 107, 4286 - 4291 (2003).

8) 4,4-p-Biphenyl bis-Phosphinidene: Generation of a bis-W(CO)5 Complex and Ab-initio Calculation of its Electronic Structure.

N.H. TRAN-HUY, H. T. LE, F. MATHEY and M. T. NGUYEN.

Journal of Chemical Society, Perkin Transactions 2, 2140 - 2145 (2002).

9) Ionized Aniline and Its Distonic Radical Cations Isomers.

H. T. LE, R. FLAMMANG, M. BARBIEUX-FLAMMANG, P. GERBAUX and M. T. NGUYEN.

International Journal of Mass Spectrometry, 217, 45-54 (2002).

10) Collisional Induced Loss of NO_2 Radical from Protonated Nitroimidazoles and Nitropyrazoles.

R. FLAMMANG, J. ELGUERO, H. T. LE, P. GERBAUX and M. T. NGUYEN.

Chemical Physics Letters, 356, 259 - 266 (2002).

MATERS THESIS

1) Mechanism and Kinetics of Chain Transfer and Back-Biting Reactions in Polyethylene Addition, Nguyen Thi Thu Cuc, presented in 7/2004 at HCMUT.

2) Kinetics of 1, 3 Hydrogen Shift of Alkyl Radical Reaction Class: An Application of the Reaction Class Transition State Theory, Pham Ho My Phuong, presented in 7/2004 at HCMUT.

3) Mechanisms of Diels-Alder Cycloaddition Reactions of Substituted Butadienes and Ethylenes, Do Quy Diem, presented in 1/2005 at HCMUT.

3. Some remarks

What we will have:

- **At the end of 2007 we will have some equipments for materials characterization: FE-SEM-Xray Micro-analysis, AFM, Spectrum Analyzer, Dilatometer…**
- **Lab. of Nanomaterial technology (HCM – National University)**

What we need:

- **Training for operating, maintenance of equipments**
- **Experience in doing researches in materials technology**


Thank You
for Your Attention