Role of National Nanotechnology Center and Code of Conduct for Responsible Nanotechnology in Thailand

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National Nanotechnology Center (NANOTEC)
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National Nanotechnology Strategy (2007-2013)

**Clusters**
- Agriculture & Foods
- Automobile parts
- Electronics
- Chemicals/Petrochemical Textiles
- OTOP
- Health & Medicals

**Research**
- Technical and Functional Textiles Program
- Nano-coating Platform
- Nano-encapsulation Platform
- Functional Nanostructures Platform
- Nano-safety
- Comp. Nanosci.

**Product Targets**
- Sensors
- Nano electronics devices
- Drug delivery systems
- Nano coating materials
- Adsorbents/Filter/Catalysts
- Cosmetics materials
Ultimate Goals

• Risk assessments

• Nano-safety guidelines for R&D

• Nano-safety framework for industrial applications of nanomaterials and nano products
NANOTEC Contribution

• International standards for **Scientific Testing** of nanomaterials and nano-products

• Together with **Public Awareness**
  • To prevent new nano-products from being shunned by consumers
  • To protect consumers from fraudulent merchandise claimed to be nano-products
Roles of NANOTEC in Nano-Safety Issues

• *Conduct* research on nanomaterials *measurements* in the laboratory, including using of existing measurement methods and developing new measurement methods.

• *Conduct* research on the *toxicity* of nanomaterials including investigating key factors for bioactivity.

• *Develop* screening tests and predictive models for toxicity, and determine the metrics of dose.

• *Conduct* risk *assessments* relevant to nanomaterials.
Nanomaterials Safety Program @ NANOTEC

Policy

- Policy study on NMs safety guidelines

Standards

- Testing standards
- Industrial awareness

Research

- Risks assessment
- CNTs and Metal oxides (TiO₂ / ZnO / Ag / etc.)
- In vitro / (in vivo) studies
- Life cycle and Environment
- Human health

Lab preparation

- Research scientists [1]
- Research assistants [1]

2008 2009 2010 2011 2012 2013

A Driving Force for National Science and Technology Capability
Network of Nanotechnology Regulation in Thailand

Standards
- TISI

Metrology
- NI MT, NSTDA

Testing
- NSTDA, NSRC, THTI, Universities

Regulation
- FDA, TISI, OCPB
Addressing Occupational Impact of Nanoparticles

Exposure routes → Exposure → Dose → Risk → Health effect → Toxicity

Characterization → Control → Reduce risk/impact
Proposed Strategies: Nano-Safety

• National Level
  - To form a **consortium** of regulatory agencies (ie. TISI, FDA, NIMT, OCPB, NSTDA/NANOTEC, THTI, etc.)
  - To drive for **National Nano-Safety Policy** on
    - Risk Assessment
    - R&D Guidelines
    - Commercial usage/production of nanomaterials and nano-products

• NANOTEC Roles
  - Standard testing protocols
  - Research with national relevance/importance
    - New
    - Adopt, Adapt and Apply
  - Policy (driver and pusher)