

## Tour de Table - THAILAND

### ***Format for the Tour de Table: Highlight of developments since the 14<sup>th</sup> meeting of the WPMN***

1. Any national developments on human health and environmental safety including recommendations, definitions, or discussions related to adapting or applying existing regulatory systems or the drafting of new laws/ regulations/amendments/ guidance materials;

### **Collaboration with Thailand Industrial Standard Institute (TISI)**

Worked on 7 industrial standardization manuals related to nanotechnology, 6 manuals (in Thai) were completed. The 6 completed manuals are:

1. Nanotechnologies Part 1: Guidance on specifying manufactured nanomaterials
2. Nanotechnologies Part 2: Guidance on material characterization for specifying manufactured nanomaterials
3. Nanotechnologies Part 3: Guidance on safe handling and disposal of nanomaterials
4. Nanotechnologies Part 4: Guidance on physio-chemical characterization for toxicologic assessment of manufactured nanomaterials
5. Nanotechnologies Part 5: Guidance on nanomaterial risk evaluation
6. Nanotechnologies Part 6: Particle size analysis using dynamic light scattering
7. Nanotechnologies Part 7: Health and safety practices in occupational setting relevant to nanomaterials (draft completed but no yet finalized)

2. Have any new activities (e.g. regulatory changes, guidance, voluntary, etc.) been initiated to implement the OECD Council Recommendation<sup>1</sup>? If yes, please explain.
3. Developments related to voluntary or stewardship schemes;

Renewed NanoQ label for Supreme Product Co.,Ltd for another 2 years (paint industry). 2 NanoQ labels are pending for fabric (bednet) and paint (smart coating)

Collaborated with the 4 NANO Plus+ Centers) and the Training of Trainers on Nanotechnology (TTN) members to include aspects of nanosafety in their workshop programs. 4 workshops on aspects of nanosafety have been conducted in which over 300 participants included students, community representatives, and local administration officials have attended.

4. Information on:

- a. risk assessment decisions, including the type of: (a) nanomaterials assessed ; (b) testing recommended; and (c) outcomes of the assessment;
- b. risk management approaches; and

<sup>1</sup> [Recommendation of the Council on the Safety Testing and Assessment of Manufactured Nanomaterials](#)

**c. any updates, including proposals, or modifications to previous regulatory decisions**

**d. new regulatory challenge(s) with respect to any action for nanomaterials**

**5. Information on any developments related to good practice documents(e.g. standards, technical guidance, technical reports, notable articles in the popular and technical literature);**

**6. Information on any developments related to Integrated Testing Strategies and/or Alternative test methods (e.g. in-vitro and in-silico methods and high throughput methods)**

The National Advanced Nano-characterization Center (NANC) is under construction and is under the NANOTEC Nano MARKS Flagship Program. The Nano Characterization Lab (NCL) is taking the leading role in setting up the center. It is expected to in operation 3<sup>rd</sup> quarter of 2016.

Since 2010 NANOTEC and National Institute of Metrology (NIMT) have collaborated to form the country's first research collaboration to build Thailand's capabilities in providing quality infrastructure in areas related to nano-scale measurement, calibration, and nanometrology. The collaboration was renewed on June 29.

**7. Research programmes or strategies designed to address human health and/ or environmental safety aspects of nanomaterials; (e.g. government, national labs, academic, industry)**

(Research paper) Interaction evaluation of silver and dithizone complexes using DFT calculations and NMR analysis.

(Research paper) Human primary erythroid cells as a more sensitive alternative in vitro hematological model for nanotoxicity studies: toxicological effects of silver

**8. Information on any public/ stakeholder consultations;**

**9. Information on research or strategies on life cycle aspects of nanomaterials, as well as positive and negative impacts on environment and health of nano-enabled applications;**

**10. Information on any development related to exposure measurement and exposure mitigation.**

**11. Information on past, current or future activities on nanotechnologies that are being done in your respective countries in co-operation on a multilateral basis, including with non-OECD countries. Including the nature of the collaboration, and the expected outcomes.**

**Collaboration with UNITAR**

In 2011, NANOTEC and UNITAR signed a Collaborative Agreement to implement a Training and Capacity Building for the Development of the Nano-Safety Pilot project in Thailand (phase 1). The first training workshop was the Nano Inception/Awareness Raising Workshop which was held

in 2012 in conjunction with NanoThailand 2012 conference. Since then several regional workshops have been initiated under this collaborative umbrella including the recent workshop being the Technical Workshop for the “Asia-Pacific Region on Nanotechnology and Manufactured Nanomaterials: Safety Issues” which was held on 10 & 11 September 2015 at Thailand Science Park in Pathumthani province, Thailand.

### ***Additional Information***

#### **12. Any consideration on the benefits of nanotechnologies;**

**Nano Fabric:** The Ministry of S&T through its National Nanotechnology Centre (Nanotec), is using nanotechnology to boost local textile industry by launching the country's first nanotech natural textiles coating centre. The centre, located at Phrae Technical College, aims to promote the use of advanced technology to add value to the folk textile business, which will in turn spur economic growth in the community. Phrae is famous for its folk-style, indigo-blue mor hom fabric and shirts.

The value of Thai textile exports is estimated at 120 billion baht a year, 5 billion baht of which comes from folk textiles. However, many folk fabrics and fabric products fade easily and are not durable. Nanotech coating addresses these weak points. The nano-surface gives a silky touch to the textile, makes it more resistant to water and has anti-bacterial and anti-fungal qualities. Different types of nano substances are used to coat different types of fabrics. The nanotech coating lasts about 20 wash.

**Control release fertiliser:** The Smart Soil and Fertiliser Flagship program at NANOTECH is developing fertiliser formulations for controlled release of nutrients for crops, using polymer materials made from naturally porous and nano-size particles (considered as nano-organic chemical). The duration of the release can be as much as 3-6 months depending on the type of crops. The polymer coatings were formed by the phase inversion technique.

**Nano sericine from silk waste:** The silk gum, a waste material that has been discarded by the locals for years, is rich in sericin and fibroin proteins, whose revitalizing benefits have long been recognized. Sericin protein contains up to 18 types of amino acids and has been shown to stimulate collagen building in skin cells and healing of scar tissue. It also displays anti-bacterial properties and can alleviate skin inflammation. Sericin finds applications in biomedicine, the production of supplements, ophthalmology, contact lenses, healing products for chronic wounds, and in hair and skin rejuvenation products. The Nanocosmeceuticals Lab at NANOTECH is working on encapsulation of sericine for efficiency of application for anti wrinkle lotion.

#### **13. Consideration of ethical implications;**