

Editorial

High-technology and Energy in Asian Environment

An example of the industrial product from the high-technology is the carbon nanotube (CNT), which are used for semi-conductor, vehicle bodies and daily living wares. Thailand, Laos and Cambodia in Asia have involved in producing CNT-made daily wares (e.g. golf ball and golf club). When the Asian Conference of Occupational Health (ACOH Conference) was held in 2012, a review of the nano-toxicology literature was talked, referring a paper on an experimental occurrence of pleural mesothelioma-like tumor in mice injected with the CNT¹. Then, the ACOH president posed to the speaker and the audience a serious question whether the production of CNT-made wares should have been banned or not, as like blue asbestos being banned in these countries.

So far USA NIOSH, EU, and New Energy and Industrial Technology Development Organization (NEDO, Japan), have completed experimental assessments of CNT, and based on the results, occupational threshold limits or standard levels for the CNT have been proposed and recommended by these governmental organizations². Therefore if the threshold limits are acknowledged by governments, industries, and trade unions, it is crucial for Asian countries as well as Japan, USA, and EU countries to follow the threshold limits.

Another example of the high technology products is the flat display for presenting digital images (e.g. liquid crystal panel, plasma display). The sintered alloy (ITO, indium-tin oxide) of indium-oxide and tin-oxide in the form of emulsion is sprayed onto the glass plate and formed into the transparent membrane conducting electricity.

Japan, Korea, Taiwan, and Hong-Kong are those countries manufacturing the ITO-sprayed flat panel. Workers inhaling ITO aerosols in Japan, Hong-Kong, and USA have been reported to cause fatal interstitial pneumonitis with alveolar proteinosis, which is now called the Indium Lung³. Once when a case report on Indium Lung with terrible conditions was made at ACOH, it was so annoying that the flat display industry in Asia were quite shocked. Nevertheless, by calling from USA NIOSH, a workshop was held with these Asian country experts and successfully depicted features of Indium Lung from slight to severe stages or fatal endpoint⁴.

Indium used to be considered as non-toxic for a long

time and therefore ACGIH, back to 15 year ago, made a recommendation for its standard level of 0.1 mg per cubic meters. However, USA National Toxicology Program did the animal inhalation study with ITO and according to the result of lung tumor occurrence, it is designated by IARC as a group 2A carcinogen (2006). Japan Society for Occupational Health⁵ for the first time has made a biological monitoring recommendation to workers for In at less than 3 ng/ml in the serum (2007). Taken together, the recognition of Indium Lung by the nations should lead to its surveillance, screening, monitoring for indium levels in the air, compensation over diseases, and reduction of In levels in the working environment.

Electricity generation has recently focused reproducible electricity from natural source (e.g. solar electricity) by using Photovoltaic panels (PV). For this end, Asian countries can take advantage of their locations in semi- and very tropical zones of the globe. Actually, the solar energy in Asia has widely been employed more and more.

PV is also another product from the high technology industry and Asia again has set up many PV producing factories. However, occupational hazards exist in the manufacturing, installation and eventually end of life waste disposal PV panels. More than 15 hazardous materials, i.e. carcinogen, irritant and toxic chemicals, sensitizing substances, are used in the manufacture of PV panels⁶. Workers are exposed to a number of cleaning agents which may be toxic.

Accordingly, ILO⁷ advocated promoting safety and health in a green economy on 28th April, 2012, “the world day for safety and health at work”. As like in the case of ITO and CNT, Asian countries in associations with international organizations and other governmental institutions will be able to overcome the potential health problems in the PV industry and PV’s life cycle in the society and environment.

References

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