

Abstract

Research on control banding approach of nanomaterials

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Objectives : Risk management of nanomaterials was needed to protect workers's health from potential hazard of nanomaterials. Under scientific level, control banding approach was proposed as one of tool of nanomaterials' risk management. Carbon nanotubes have been produced in scale of industry. This study was conducted to investigate use status, exposure scenario and to do risk assessment on exposure of carbon nanotubes using nanomaterial control banding approach. Also it was investigated that hazard of carbon nanotubes was communicated by material safety data sheet.

Method : The hazard and exposure components of several nanomaterial control banding of was reviewed by papers. The site visits was conducted on 7 carbon nanotubes manufacturing and 4 workplaces of handling carbon nanotubes. Classification on jobs handling carbon nanotubes was conducted to do risk assessment of carbon nanotubes. Material safety data sheet of carbon nanotubes were collected at workplaces. Guideline

to protect workers' health from nanomaterials was developed.

Results : Risk assessment on nanomaterials should be conducted to obey the regulation of European Commissions. The precautionary principles is applied to method of risk assesment of nanomaterials. In some workplaces handling carbon nanotubes, jobs were classified as followed; synthesis, packing, weighing, pouring of package, production of dispersion liquid, production of master batch, spraying film. In applying Stoffenmanager nano, task based exposure class of pouring of package was highest (E4) and task based exposure class of, packing, weighing, pouring of package, production of dispersion liquid, production of master batch and spraying film were E3. Time and frequency based exposure class of pouring of packing, packing and production of dispersion liquid were E3 and of weighing, production of master batch and spraying film were E2. Material safety data sheet of carbon nanotubes manufacturing in Korea were written by reviewing graphite or toxicological data of other carbon nanotubes of foreign country. But MSDS of carbon nanotubes of Arkema and Nanocyl were written by their own toxicology information.

Discussion : Carbon nanotubes are handled in process of packing or pouring packing by power or flake form. There is potential exposure to carbon nanotubes and is needed installation of local exhaust in process of packing or pouring packing. Material safety data sheet of carbon nanotubes manufactured in Korea has inconsistent toxicological data because the data is collected at toxicological data of graphite or website. Toxicological information is needed from experiment of their own carbon nanotubes because carbon nanotubes might have different toxicological effect.

Keywords : nanomaterial, control banding, carbon nanotubes, material safety data sheet