Nanomaterial Exposure Assessment of Carbonaceous Compounds from Carbon Fiber Processing Laboratory

Mat Tamizi Zainuddin[1,*], Sudirman Sahid[1], Mohamad Azmiruddin Ahmad[1], Nurazilah Mohd Zainon[1]

[1] Industrial Centre of Innovation in Biomedical, SIRIM Berhad, Kulim HiTech Park, MALAYSIA

[*]tamizi@sirim.my

Expanding applications on nanomaterial-based products of carbon fiber from research to industry should be considered on the concern aspects of potential toxicity especially in occupational safety related to the nano-particulate emission. In order to evaluate this matter as well as their interaction towards biological for hazardous evaluation, it is important to comprehend and precisely determine their physicochemical properties. In spite of that, inconclusive data on physicochemical properties still being a stumbling point for an authoritative framework on nanomaterials to synchronize the relevance of certain physicochemical endpoints toward toxicological effects. The question arise on which physicochemical endpoints or technological solutions are currently available to support the requested characterization of nanomaterial-based products. Established standard test method that could be satisfactory to evaluate physicochemical endpoints has been strategized to pinpoint such decision framework for nanomaterials assessment. This work encompasses chemical and physical methods from multiple points of analytical techniques for determination of physicochemical parameters on nanoparticulate emission within carbon fiber processing laboratory. Microscopic analysis through SEM and TEM revealed the presence of carbon nanofiber with diameter ranging from 80 to 250 nanometers with several aggregation and agglomeration states whereas data from EDS stated the presence of carbon, oxygen and silicon elements within the collected nano-emission particles. Data from these physicochemical analysis and concentration of exposure have been synchronized toward formation of control banding within nanomaterial risk assessment in order to address exposure prevention and risk management in a consistent manner to be useful and interpretable for future users of nanomaterial risk assessment for such carbon fiber processing. These data have been synchronized in developing the control banding within nanomaterial risk assessment toward formation of exposure prevention and risk management in a consistent manner to be practical and interpretable for future activities in the carbon fiber processing laboratory.