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To: NIOSH Docket Office (CDC)
Cc: Chen, Jihong (Jane) (CDC/NIOSH/EID) (CTR)
Subject: 161-A - Occupational Exposure to Carbon Nanotubes and Nanofibers Comments

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Comments

I appreciate your challenging and tough work. I learned a lot from the document. My concern is about exposure measurement of CNTs, although it is not directly related to risk assessment of CNTs. One of the difficult problems relating to CNT is a lack of exposure assessment method. To connect the hazard data and the exposure data, some metric is needed, but in the present status, only gravimetric mass and amount of chemicals included in the nanomaterial can do. I trust that carbon analysis by using thermal-optical method like NIOSH 5040 is a useful tool to assess the CNT exposure. Though the detection limit of carbon analysis is not enough to analyze sub-microgram per cubic meter level of CNTs, we can acquire some information of CNT exposure by this method.

I have two questions about sampling for this analysis.

- 1) Even if you want to know full-shift exposure, sampling has to be conducted only when the work possibly generating the CNT aerosols is done. Longer sampling duration may make the background concentration of carbon higher. Sampling duration and assessment of background concentration of carbon in each work environment is very important.
- 2) Usually most of CNTs suspend in the air as aggregates/agglomerates. What is your opinion about the sampling of size separated sampling. My opinion is that sampling should be conducted for PM4, because we do not have enough information on the behavior of agglomerated CNTs. For safe side, CNT in respirable size or greater is better to be monitored.