

Evaluation of particles emission during operation of Three-dimensional (3D) printer

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The nanoparticle emission from 3D printing has been drawing the attention of many researchers recently due to adverse health impacts.

This study aimed to evaluate particle emission from a 3D printer in a test chamber by using different types of filaments according to three stages of the printing process: heating, printing, and post-printing. The particle number concentration was measured by the ELPI®+ Dekati (Electrical Low-Pressure Impactor, range size 6nm-10um). Moreover, particle samples were collected to attain morphologic and compositional information by using Transmission Electron Microscope (TEM).

The results reveal that particle number concentration variation depends on printing stages, feed speed, nozzle temperature, and filament materials. Therefore, in order to reduce the nanoparticle emission from 3D printing, low printing temperature, environmentally-friendly materials, and control method should be applied.

Acknowledgement: This study was funded by the Korea Ministry of Environment (MOE) as “the Environmental Health. Action Program (2016001360005)”