



Finnish Institute of
Occupational Health

Well-being through work

Characterization And Control Of Nanoparticle Emissions From Desktop 3D-Printers

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Background

- 3D-printing are becoming more common
- Different printing techniques exist
- Most popular technique for small scale printing is based on **Material Extrusion (ME)**
 - Thermoplastic polymers as a printing material
 - Acrylonitrile Butadiene Styrene (ABS)
 - Poly-Lactid Acid (PLA)

Background

- 3D-printers based on ME are shown to strongly emit nanosized particles (Mendes et al. 2016, Kim et al. 2015, Stephens et al. 2013)
- The use of control measures are seen essential

Methods

- Typical office room
- Instruments
 - Pegasor AQ Indoor, Pegasor Oy
 - SMPS, model 3936, TSI Inc.

Conclusions

- Desktop 3D-printers emit nanoparticles
 - Protective measures are needed in order to reach the FIOH-NRV ($40\ 000\ \text{cm}^{-3}$)
 - Typicall office room ventilation is not sufficient to control the emissions

More information

- The webpage of the research project
http://www.ttl.fi/fi/tutkimus/hankkeet/3d_tulostuksen_kaasu_ja_hiukkaspaaatot_eri_tyovaiheissa/sivut/default.aspx
- Poster by Kangas et al.

Acknowledgements and references

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Thank you!



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