



## Are nanoparticles in construction products an occupational health hazard?

### Toward responsible development and effective risk management of nano-enabled products in the U.S. construction industry

Gavin H. West, Bruce E. Lippy, Michael R. Cooper, Daniel Marsick, Leonard G. Burrelli, Kelsey N. Griffin and Alan M. Segrave. *Journal of Nanoparticle Research*, 2016.

#### Overview

Researchers compiled an inventory of commercial construction materials reported to contain engineered nanomaterials (ENMs), and surveyed construction health and safety trainers. Researchers also measured potential worker exposures to titanium dioxide (TiO<sub>2</sub>) nanoparticles while cutting, drilling and nailing photocatalytic roof tiles, and the effectiveness of local exhaust ventilation (LEV) in reducing these exposures.

#### Key Findings

- Over 450 commercial construction products are reported to be nano-enabled. Cement, insulation and coatings were most frequently identified. Polymers, titanium dioxide, silica polymorphs, zinc oxide and carbon nanotubes were the most frequently reported ENMs.
- In most cases, Safety Data Sheets and product literature available online did not provide sufficient information to determine the specific chemical composition of reported ENMs.
- Most construction health and safety trainers surveyed (52%) were unaware that construction products containing nanomaterials were commercially available in the United States.
- The smallest TiO<sub>2</sub> particles detected while working with the tiles were 138 nanometers. For comparison, nanoparticles are most commonly defined as approximately 1 to 100 nanometers.
- Microscopic analysis suggested that most of the TiO<sub>2</sub> particles in dust samples collected remained attached to larger pieces of the roofing tile, which is expected to decrease toxicity.
- Exposures were below Recommended Exposure Limits for TiO<sub>2</sub> established by NIOSH.
- LEV reduced mean exposures to TiO<sub>2</sub>, respirable dust and particles ranging from 20 to 1,000 nanometers by approximately 95%. These results and prior studies suggest that engineering controls – and where necessary, respirators – can reduce possible risks to workers until the health effects of ENM exposures are better understood.

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#### See abstract:

<http://bit.ly/1LBcGIQ>

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