

A need for improved efficiency in nanomanufacturing

October 28 2008

New research shows that environmental gains derived from the use of nanomaterials may be offset in part by the processes used to manufacture them. Research published in a special issue of the *Journal of Industrial Ecology*, a peer-reviewed journal owned by Yale University and headquartered at the Yale School of Forestry and Environmental Studies, highlights the need for improved efficiency in the manufacturing of nanoscale materials to reduce energy use, emissions, solid waste, and the use of toxic input materials.

"Research in this issue reveals the potential of environmental impacts from nanomanufacturing to offset the benefits of using lighter nanomaterials," says Gus Speth, dean of the Yale University School of Forestry & Environmental Studies. "To date, most attention has focused on the possible toxic effects of exposure to nanoparticles—and appropriately so. But the 'old-fashioned' considerations of pollution and energy use arising from the production technologies used to make nanomaterials need attention as well."

One study, by Vikas Khanna and colleagues at the Ohio State University, found that the life-cycle environmental impacts of carbon nanofiber (CNF) production may be as much as 100 times greater per unit of weight than those of traditional materials. According to another paper by Hatice Şengül and colleagues at the University of Illinois at Chicago, strict material purity requirements, lower tolerances for defects and lower yields of manufacturing processes may lead to greater environmental burdens than those associated with conventional

manufacturing.

"There is often a misconception that nanoscale production will necessarily be green and clean," says David Rejeski, director of the Project on Emerging Nanotechnologies (PEN), which helped support the production of this special issue. "This research shows that clean nanoscale production is not happening everywhere and it probably will not without a concerted effort by government and industry to green the emerging production infrastructure for nano materials and products."

Full text of the articles in the special issue is available for download at www.interscience.wiley.com/journal/jie-nano .

Source: Project on Emerging Nanotechnologies

Citation: A need for improved efficiency in nanomanufacturing (2008, October 28) retrieved 26 April 2024 from <https://phys.org/news/2008-10-efficiency-nanomanufacturing.html>

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