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Editorial
Particles, Aerosols, and Their Transport in Built Environment

Particles, aerosols, or collectively called particulate matters (PM) are ubiquitous indoor and outdoor pollutants. Suspended PM are usually comprised of combustion products, fibers, organic debris, bioaerosols, aeropathogens, and a variety of other materials. Indoor biological PM are normally generated from air-conditioning systems, humidifiers, occupants, household pets, and even air cleaners. Air cleaners can be effective in removing particulates, but may also incubate fungi and microorganisms. Pollens, fungi, and other allergens can also be brought to indoors by ventilation and infiltration. It is known that PM may be suspended in an indoor space so that they may be inhaled by the occupants and deposited on the nasal passage with potential harmful effects such as causing irritation to airways and skin as well as provoking asthma and allergy. PM may also be deposited on interior surfaces, causing a soiling problem and further leading to damage, for example on art work. Furthermore, epidemiologic studies have indicated that some infectious diseases, such as flu, tuberculosis and severe acute respiratory syndrome (SARS), may be transmitted by airborne particles that contain or carry the viruses.

The importance of indoor PM for contributing to adverse health outcomes has motivated substantial scientific research over the past few decades. In particular, the triennial series of International Conferences on Indoor Air Quality and Climate (Indoor Air) provide an important venue to discuss the results of such studies. The 10th conference in this series, *Indoor Air 2005*, was held September 5-9, 2005 in Beijing, China. This conference attracted near 1000 participants from almost 50 countries. It featured eight plenary lectures, 17 forums and more than 900 contributed papers in 120 parallel sessions that were published in the conference proceedings. To help disseminate key findings, the organizer of *Indoor Air 2005* has invited selected authors to expand significantly their papers for publication in special issues of several well-known international journals. This special issue of *Atmospheric Environment* publishes ten carefully selected and peer reviewed papers focusing on particles or aerosols and their transport in built environment.

The first five papers in this special issue addressed source identification. Tsai et al. measured and analyzed airborne fungi in representative U.S. office buildings for different locations and seasons. The results provide possible guidance for developing indoor bioaerosol guidelines. Haas et al. studied the influence of mold growth indoors on fungal spore concentration by sampling 66 households in Austria. The results indicate that mold could be a possible source of fungal, *Penicillium*, and *Aspergillus* spores. Bekö et al. investigated oxidation processes on filter surfaces by using ultrafine particle production or ozone removal as probes. Their study shows that the service time of filters influences ozone removal and the secondary organic aerosols generation. The study from Zuraimi et al. examined the effect of building recirculation rates on the concentrations of secondary organic aerosol resulting from

reactions between indoor limonene and ozone. The size-distribution of the particle concentration changes with changing recirculation rates, shifting towards larger particles at larger recirculation rates. Jamieson et al. studied experimentally the factors affecting “electrosmog” indoors in an office building such as air ions, air filtration, indoor air relative humidity, and dew point temperature.

The next four papers discussed simulations and measurements of PM transport and distribution. Zhang and Chen simulated particle transport in enclosed spaces by a Lagrangian and an Eulerian method. The paper discusses performance of the two models for both steady and unsteady particle transport. Lai and Chen compared an Eulerian model and a Lagrangian model for indoor particle dispersion simulation. The results show that the Eulerian model is better than the Lagrangian one. Gomes et al. presented and developed a controlled and characterized method to explore the influence of human walking on the aerosolization of allergen-containing particles. The results indicate that the method can be utilized to develop a database for particle resuspension rates. Tan and Wexler developed a laboratory prototype of ultrafine particle sizer, which can detect particles as small as 25 nm. The paper compared the prototype with a condensation particle counter.

The last paper but not the least from Liu et al. used residential indoor concentrations to predict personal exposures to carbonyls. They found that activities related to driving a vehicle and performing yard work have significant impacts on personal exposures to a few carbonyls.

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Guest editors:

Qingyan (Yan) Chen
School of Mechanical Engineering
Purdue University
West Lafayette, IN 47907-2088, USA
E-mail address: yanchen@purdue.edu

Xudong Yang and Bin Zhao
Department of Building Science
School of Architecture
Tsinghua University, Beijing 100084, China