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Editorial

Preface: Environmental nanotechnol

Cai Lun is an ancient Chinese (50-121 CE); Johannes Gutenberg is an ancient European (1398-1468 CE). They never met each other of course. Yet, their works collectively made a great contribution to the spread of knowledge in history. Cai Lun is known as the inventor of paper and the papermaking process while Gutenberg was the first European who introduced the printing press and movable type into Europe. A combination of printing press and paper not only made the Gutenberg Bible but also opened up a new horizon of knowledge-learning for the masses in Europe. Knowledge becomes power. This is a beauty of synergy.

Today, the nanotechnology represents another potential example of synergy. As the Nanotechnology White Paper of US Environmental Protection Agency (2007) pointed out that "in the long-term, nanotechnology will likely be increasingly discussed within the context of the convergence, integration, and synergy of nanotechnology, biotechnology, information technology, and cognitive technology", it is clear that the interdisciplinary collaboration is essential to the generation of synergy and breakthroughs in nanotechnology.

Over the past decade, the field of environmental nanotechnology has seen remarkable developments in terms of both the diversity of materials designed for pollution management and the breath of applications nanotechnology has brought about across many subfields of environmental science and engineering. On the other end of the spectrum, however, nanotechnology has triggered public concerns over the pervasive use of manufactured nanomaterials in a broad array of consumer products and the ecological and health impacts caused by their potential release into the environment. To better manage the two sides of environmental nanotechnology, we would like to use this special issue to deliver a timely and updated understanding of the interactions between engineered nanomaterials and the complex environmental media.

In this special issue, we have selected thirty outstanding papers including fifteen research papers addressing nanomaterial applications, seven papers related to the fate and transport of nanomaterials, four papers focusing on metrology, and four critical reviews. The applications cover a wide array of novel nanomaterials for pollutant mitigation and ecosystem restoration. The metrology studies focus on new technologies for selective electrochemical sensing, quantification, and analysis of environmental pollutants including nanomaterials of anthropogenic origins. The fate and transport papers examine physicochemical interactions of nanomaterials with the environmental media that influence their colloidal stability, reactivity, and mobility and interactions of nanomaterials with organisms that impact on the toxicity and bioavailability. Besides, studies examining the release of silver nanoparticles and nano-sized debris from household products and building materials, respectively, are also included in this special issue. The critical reviews thoroughly discuss the merits and implications of engineered nanoparticles in many aspects from their impacts on food crops and workplace health and safety to their beneficial uses for environmental protection.

The editors hope that this special issue would provide its readers a glimpse of the current progress in nanomaterial research that has potentially benefited our society, and at the same time convey the importance of responsible development of nanotechnology. Finally, the editors thank all authors from all over the world who have made great contributions to this special issue. We greatly appreciate the support from all reviewers and editorial staff of the *Journal of Hazardous Materials.*

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