NanoParticle

Title	**Magnetic nanoparticles: Essential factors for sustainable environmental applications**
Author Name	Samuel C.N. Tang, Irene M.C. Lo
Journal Name	Water Research
Year	2013
Volume and Issue	Volume 47, Issue 8,
Pages	2613–2632
Abstracts	In recent years, there has been an increasing use of engineered magnetic nanoparticles for remediation and water treatments, leading to elevated public concerns. To this end, it is necessary to enhance the understanding of how these magnetic nanoparticles react with contaminants and interact with the surrounding environment during applications. This review aims to provide a holistic overview of current knowledge of magnetic nanoparticles in environmental applications, emphasizing studies of zero-valent iron (nZVI), magnetite (Fe_3O_4) and maghemite (γ-Fe_2O_3) nanoparticles. Contaminant removal mechanisms by magnetic nanoparticles are presented, along with factors affecting the ability of contaminant desorption. Factors influencing the recovery of magnetic nanoparticles are outlined, describing the challenges of magnetic particle collection. The aggregation of magnetic nanoparticles is described, and methods for enhancing stability are summarized. Moreover, the toxicological effects owing to magnetic nanoparticles are discussed. It is possible that magnetic nanoparticles can be applied sustainably after detailed consideration of these discussed factors.
Keywords	

Title	**Silica nanoparticles capture atmospheric lead: Implications in the treatment of environmental heavy metal pollution**
Author Name	Xifei Yanga, Zhiguo Shenb, Bing Zhanga, Jianping Yangc, Wen-Xu Honga, Zhixiong Zhuanga, Jianjun Liu
Journal Name	Chemosphere
Year	2013
Volume and Issue	90
Pages	653–656
Abstracts	Lead (Pb) contamination in the air is a severe global problem, most notably in China. Removal of Pb from polluted air remains a significant challenge. It is unclear what potential effects silica nanoparticles (SiNPs) exposure can have on atmospheric Pb. Here we first characterized the features of SiNPs by measuring the particle size, zeta potential and the specific surface area of SiO_2 particles using a Nicomp 380/ZLS submicron particle sizer, the Brunauer – Emmett–Teller (BET) method and transmission electronic microscopy (TEM). We measured the content of the metal Pb adsorbed by SiNPs exposed to two Pb polluted electric battery plants using inductively coupled plasma mass spectrometry (ICP-MS). It is found that SiNPs exposed to two Pb polluted electric battery plants absorb more

	atmospheric Pb compared to either blank control or micro-sized SiO2 particles in a time-dependent manner. This is the first study demonstrating that SiNPs exposure can absorb atmospheric Pb in the polluted environment. These novel findings indicate that SiNPs have potential to serve as a significant adsorbent of Pb from industrial pollution, implicating a potentially novel application of SiNPs in the treatment of environmental heavy metal pollution.
Keywords	

Title	**Investigation of gold nanoparticles uptake and their tissue level distribution in rice plants by laser ablation-inductively coupled-mass spectrometry**
Author Name	Jeremy Koelmel, Thomas Leland, Huanhua Wang, Dulasiri Amarasiriwardena, Baoshan Xing
Journal Name	Environmental Pollution
Year	2013
Volume and Issue	174
Pages	222-228
Abstracts	Lead (Pb) contamination in the air is a severe global problem, most notably in China. Removal of Pb from polluted air remains a significant challenge. It is unclear what potential effects silica nanoparticles (SiNPs) exposure can have on atmospheric Pb. Here we first characterized the features of SiNPs by measuring the particle size, zeta potential and the specific surface area of SiO2 particles using a Nicomp 380/ZLS submicron particle sizer, the Brunauer–Emmett–Teller (BET) method and transmission electronic microscopy (TEM). We measured the content of the metal Pb adsorbed by SiNPs exposed to two Pb polluted electric battery plants using inductively coupled plasma mass spectrometry (ICP-MS). It is found that SiNPs exposed to two Pb polluted electric battery plants absorb more atmospheric Pb compared to either blank control or micro-sized SiO2 particles in a time-dependent manner. This is the first study demonstrating that SiNPs exposure can absorb atmospheric Pb in the polluted environment. These novel findings indicate that SiNPs have potential to serve as a significant adsorbent of Pb from industrial pollution, implicating a potentially novel application of SiNPs in the treatment of environmental heavy metal pollution.
Keywords	

Title	**The greener synthesis of nanoparticles**
Author Name	Oxana V. Kharissova, H.V. Rasika Dias, Boris I. Kharisov, Betsabee Olvera, Pe´rez, and Victor M. Jime´nez Pe´rez
Journal Name	Trends in Biotechnology
Year	2013
Volume and Issue	31, No. 4
Pages	
Abstracts	In this review, we examine ‘greener’ routes to nanoparticles of zerovalent metals, metal oxides, and salts with an emphasis on recent developments. Products from nature or those

	derived from natural products, such as extracts of various plants or parts of plants, tea, coffee, banana, simple amino acids, as well as wine, table sugar and glucose, have been used as reductants and as cappingagentsduringsynthesis.Polyphenols foundinplant material often play a key role in these processes. The techniques involved are simple, environmentally friendly, and generally one-pot processes. Tea extracts with high polyphenol content act as both chelating/reducing and capping agents for nanoparticles. We discuss the key materials used in the field: silver, gold, iron, metal alloys, oxides, and salts.
Keywords	

Title	**Synthesis of metallic nanoparticles using plant extracts**
Author Name	Amit Kumar Mittal, Yusuf Chisti, Uttam Chand Banerjee
Journal Name	Biotechnology Advances
Year	2013
Volume and Issue	Volume 31, Issue 2,
Pages	346–356
Abstracts	Biomolecules present in plant extracts can be used to reduce metal ions to nanoparticles in a single-step green synthesis process. This biogenic reduction of metal ion to base metal is quite rapid, readily conducted at room temperature and pressure, and easily scaled up. Synthesis mediated by plant extracts is environmentally benign. The reducing agents involved include the various water soluble plant metabolites (e.g. alkaloids, phenolic compounds, terpenoids) and co-enzymes. Silver (Ag) and gold (Au) nanoparticles have been the particular focus of plant-based syntheses. Extracts of a diverse range of plant species have been successfully used in making nanoparticles. In addition to plant extracts, live plants can be used for the synthesis. Here we review the methods of making nanoparticles using plant extracts. Methods of particle characterization are reviewed and potential applications of the particles in medicine are discussed.
Keywords	