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Production of nanoparticles from electronic waste

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Nanoparticles are particles that have their size in the nanoscale range. There are many methods for the production of nanoparticles, but the production of nanoparticles from electronic waste (e-waste) is much more environmentally friendly. This method aids in reducing large quantities of e-waste. E-waste is one of the world's fast-growing and challenging solid waste streams because of its complex nature. It is composed of a mixture of metals, plastics and other hazardous components. Current resource and recycling methods are inadequate, thus alternative approaches are highly required. E-waste components from monitors and motherboards can be utilised to synthesise nanoparticles. Initially, these wastes need to be pretreated with strong acids to separate any contaminants. Further, heating the plastic and metal particles in the waste above 9000Ã¢â€žÆ’ in a closed autoclave reactor is adequate for the separation of nanoparticles from the e-waste. The high heat causes the breakdown of larger metal particles to form free nanoparticles. The particles in the waste materials act as a thermal micronising media and protect the nanoparticles from oxidation. The thermal transformation mechanism is studied under the scanning electron microscope (SEM) and transmission electron microscope (TEM). These nanoparticles derived from e-waste can be used for wastewater treatment, remediation of water, monitoring pollutants in water and the capture of air pollutants.

Keywords: Electronic Waste, Nanoparticles, Incineration

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