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***Chemistry/Cleantech***

***Title:*** ***Method for Recovery of Silver Nanoparticles*** ***UMD18-05***

***Inventors:*** ***Sukalyan Sengupta, Ph.D., et al.***

***Applications:*** The invention provides a novel method for removal of silver from aqueous wastestreams such as laundry washwater, which may be contaminated with silver nanoparticles used in textile products. It is also applicable to other industrial wastestreams containing dilute concentrations of silver.

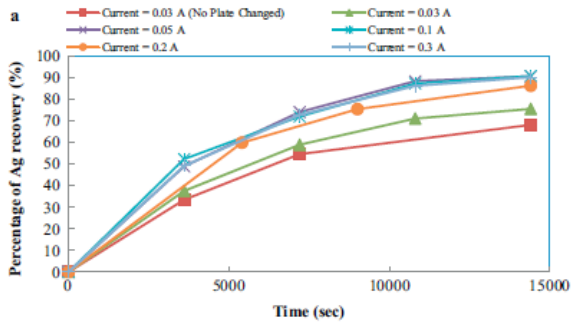
***Benefits:***

- ***Green technology***: Prevents environmental contamination from silver, which is classified as a hazardous material.
- ***Economic benefits:*** Allows for recovery and reuse of silver. Ion exchange cartridges can also be recharged and reused.
- ***Ease of Use:*** Cartridges will be easy to install, use and replace.

***Technology Description:***

Silver nanoparticles are impregnated in many textile products due to their anti-microbial and deodorant properties. Leaching of silver from textiles during laundry operations can pose an environmental challenge due to the ecotoxicological risks of silver. This invention comprises a novel ion-exchange based technology implemented through replaceable cartridges. As an aqueous waste stream flows through the ion-exchange cartridge, silver is selectively removed and captured. Once the cartridge is exhausted, i.e. its capacity to remove silver is reached, it can be exchanged with a fresh cartridge, and the exhausted cartridge can be regenerated and reused. The technology allows recovery of silver from laundry washwater as silver nanoparticles, which have high commercial value and can then be used in many industries such as medicines, textiles, and electronics.

***Patent Status:*** The invention is the subject of a pending U.S. utility patent application. The research underlying this invention has been published as Nawaz et al. Journal of Environmental Sciences, 2018, https://doi.org/10.1016/j.jes.2018.09.012, and Nawaz and Sengupta, ACS Sustain. Chem. Eng., 6 (1) (2017), pp. 600-608 and Sep. Purif. Technol., 176 (2017), pp. 145-158.




*Percentage of silver recovery with electrolysis time at varying currents.*

***For more information:***

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