Recepción de resumenes CCG

Titulo / Autores / Institución

TITULO DE LA PONENCIA

Bio-Functionalization of Magnetic Nanoparticles for Mercury Remediation: A Sustainable Approach Using Regional Biomass

AUTORES

Maria Margarita Vecino-Mantilla1, Carlos Pinilla1, Diego Escandon1, Alfredo Lora1, Neil L. Allan2, Sean Davis 2

INSTITUCIÓN

1Dept. Physics and Geosciences, Universidad del Norte; Puerto Colombia, Colombia. 2School of Chemistry, University of Bristol; Cantock's Close, Bristol BS8 1TS, U.K.

CORREO ELECTRÓNICO

mmvecino@uninorte.edu.co

Estilo preferido

ESTILO DE PRESENTACIÓN

- Presentación Oral

Categoría del resumen

ÁREA TEMÁTICA

Ambiente y sociedad

LINEAS TEMÁTICAS AS

Sostenibilidad y desarrollo

Resumen

PALABRAS CLAVE

thiol; nanoparticles, functionalization, remediation, mercury

CONTENIDO DEL RESUMEN

The population growth of the last decades and the increase in anthropogenic activities have led to technological industrial development, however, these factors have also been the main cause of the increase in environmental pollution in different ecosystems. Water is a vital resource, it makes up 70% of the planet Earth, and it is one of the main resources affected by the different sources of pollution, thereby putting its different ecosystems and species, including humans, at risk. The contamination of water sources by heavy metals is one of the most worrying issues,

due to its high impact on human health, with mercury receiving special attention since even in low concentrations it is highly harmful 1. In Colombia, mercury contamination in water is a significant environmental concern in, where artisanal and unregulated mining has intensified this problem and contribute to the highest per capita mercury presence globally, resulting in increasing mercury concentrations that bioaccumulate in living organisms and impact the food chain 2,3. Despite numerous remediation efforts, challenges persist in terms of high costs, low efficiency, and difficulty in large-scale implementation. This study proposes the use of local fruits and their residual biomass as raw material for thiols extraction for functionalization of magnetic based nanoparticles, targeting of develop a sustainable adsorbent of mercury dissolved in water. In particular, our work uses novel functionalized magnetite (Fe3O4)-based nanoparticles due to their low cost, low toxicity and minimal environmental impact. This approach not only reduces the cost of functionalization but also promotes environmental sustainability by utilizing agricultural waste, and circular economy. Finally, we combine the experimental goals with computational modelling of mercury species with the thiols to understand the adsorption interaction

REFERENCIAS BIBLIOGRÁFICAS

(1) Xu, Z.; Zhang, Q.; Li, X.; Huang, X. A Critical Review on Chemical Analysis of Heavy Metal Complexes in Water/Wastewater and the Mechanism of Treatment Methods. Chemical Engineering Journal 2022, 429 (May 2021), 131688. https://doi.org/10.1016/j.cej.2021.131688.
(2) Cordy, P.; Veiga, M. M.; Salih, I.; Al-Saadi, S.; Console, S.; Garcia, O.; Mesa, L. A.; Velásquez-López, P. C.; Roeser, M. Mercury Contamination from Artisanal Gold Mining in Antioquia, Colombia: The World's Highest per Capita Mercury Pollution. Science of the Total Environment 2011, 410–411, 154–160. https://doi.org/10.1016/j.scitotenv.2011.09.006.
(3) UNITED NATIONS ENVIROMENT PROGRAMME. Time to Act; Kirby, A., Rucevska, I., Yemelin, V., Cooke, C., Eds.; 2013; Vol. 1. https://doi.org/10.1038/ngeo275.