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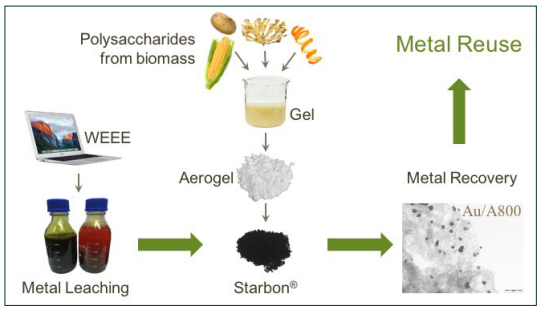
Recovery of gold from WEEE using bio-based mesoporous materials: Starbons®

Jennifer Attard, Avtar S Matharu and James H Clark
Green Chemistry Centre of Excellence-University of York, UK



The demand for gold has increased as tech industries exploit its excellent electrical properties. Continuous developments motivate consumers to upgrade their tech devices, which result in the disposal of large volumes of e-waste containing complex and toxic mixtures of metals, including gold. High prices, a growing demand and diminishing availability make gold a critical element, so its recovery from secondary sources is essential. Cyanidation and pyro/hydrometallurgical processes have been widely used to recover gold from e-waste but these have resulted in contaminated ecosystems and elevated economic impacts. Porous carbons, such as activated carbons, are a cost effective and environmentally friendly alternative. The adsorption mechanism of gold by these materials is oxidation of the functional groups on the carbon surface, with the subsequent reduction of Au3+ to form gold nanoparticles. Activated carbons are often highly microporous, causing irreversible adsorption of gold due to the pore's high surface energy. Mesoporous materials with better diffusional properties are often superior. Starbons® are a patented-class of bio-based largely mesoporous carbons which can be easily tuned in terms of pore structure and surface energy by varying the carbonization temperature. Starbons® range from polysaccharide-like at low temperatures to graphite-like at higher temperatures. Starbons® have shown excellent adsorption capacities for gold at high carbonization temperatures and can be highly selective.

Recent Publications

1. J Attard, R Milescu, V Budarin, A S Matharu and J H (2018) Unexpected nitrile formation in bio-based mesoporous materials (Starbons®)Clark. *Chemical Communications*; 6.

2. C Schaude, E Fröhlich, C Meindl, J Attard, B Binder and J G Mohr (2017) The development of indicator cotton swabs for the detection of pH in wounds. *Sensors*; 17(6): 1365.

Biography

Jennifer Attard has pursued her BSc in Chemistry with Materials from the University of Malta. Currently she is pursuing PhD at the Green Chemistry Centre of Excellence at the University of York, an internationally-leading academic facility for pioneering pure and applied green and sustainable chemical research. Throughout the course of her PhD, she has worked on collaborative research projects with companies including Unilever, Circa Sustainable Chemicals and LEO Pharma.

ja1024@york.ac.uk

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