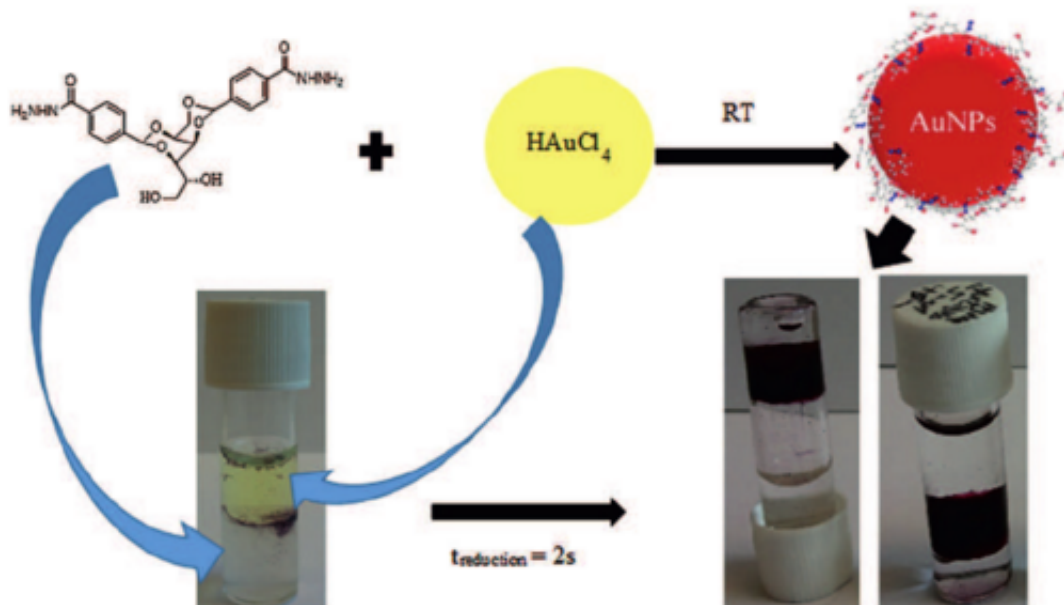


Conducting gels—from waste to wealth

November 9 2015



Structure of DBS-CONHNH₂ and schematic of gold salt adsorption and in-situ reduction, along with representative photo-graphs of the gels. Credit: *Angewandte Chemie International Edition* (2015). DOI: 10.1002/anie.201507684

Research by scientists at the University of York has demonstrated an innovative way of using a gel to extract precious metals such as silver and gold from waste and convert them into conducting nanoparticles to form a hybrid nanomaterial potentially suitable for a range of high-tech applications.

Discarded electronic devices are an ever-increasing waste stream containing high-value [precious metals](#) such as silver and gold. Making

use of this resource was the inspiration for the research by a team from the Department of Chemistry at York.

Professor David Smith and Babatunde Okesola, a PhD student supported by The Wild Fund, discovered that their self-assembling [gels](#) derived from sorbitol, a simple sugar, could selectively extract precious metals from complex mixtures of other metals typical of the electronics or mining industries.

On exposure to the gel, not only were the precious metals selectively extracted, but they were also then converted into conducting nanoparticles via an in situ chemical reduction process, caused by the nanofibres of the gel network. These conducting nanoparticles become embedded in the gel giving it enhanced electrical conductance.

Fellow Department of Chemistry researchers, Dr Alison Parkin and Sindhu Suravaram, helped demonstrate the reduction mechanism which converts the metal ions into nanoparticles and explored the conducting nature of the resulting [soft materials](#). The research is published in *Angewandte Chemie*.

Babatunde Okesola said: "Importantly, gels have properties of both solids and liquids so these conducting gels are potentially ideal to bridge between the soft, wet world of biology and the hard, dry world of electronics. Being able to 'wire up' this interface will be of increasing importance in future technologies."

Dr Smith added: "We hope to go on and test our gels using real-world electronic waste, and also explore the potential applications of the resulting materials at the interface between biology and electronics." This will allow Professor Smith, Dr Parkin and their research teams to use the gels to convert waste into new soft materials capable of high-tech applications in their own right.

More information: Babatunde O. Okesola et al. Selective Extraction and In-Situ Reduction of Precious Metal Salts from Model Waste to Generate Hybrid Gels with Embedded Electrocatalytic Nanoparticles, *Angewandte Chemie International Edition* (2015). [DOI: 10.1002/anie.201507684](https://doi.org/10.1002/anie.201507684)

Provided by University of York

Citation: Conducting gels—from waste to wealth (2015, November 9) retrieved 25 April 2024 from <https://phys.org/news/2015-11-gelsfrom-wealth.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.