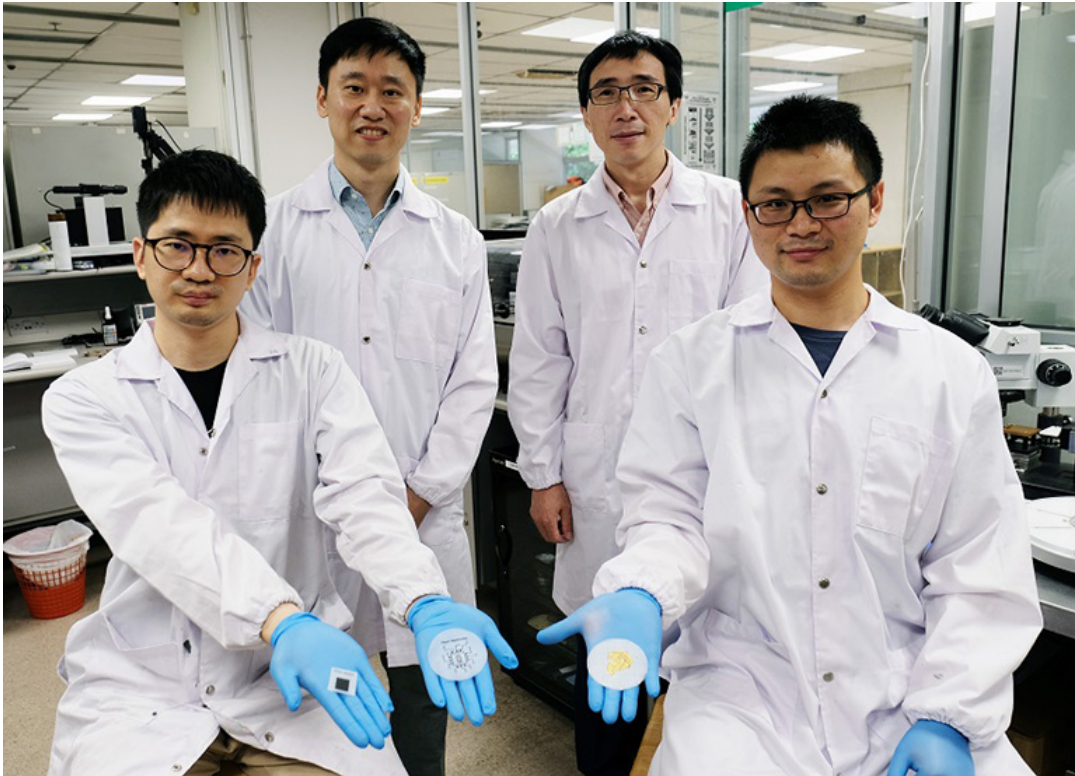


Biodegradable Screen Printed Paper Batteries for Wearable Medgadgets

📅 DECEMBER 21ST, 2021

👤 CONN HASTINGS

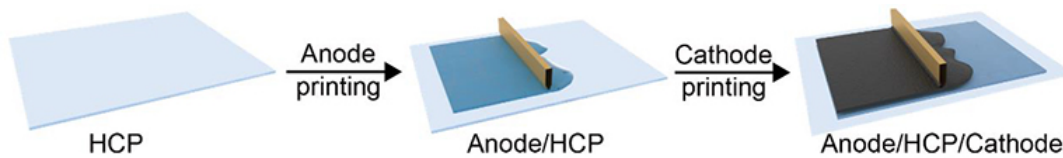
📁 MATERIALS



Researchers at Nanyang Technological University, Singapore (NTU Singapore) have developed a thin and flexible paper battery that has significant potential as a component in wearable health tech. The device consists of cellulose paper that has been reinforced with a hydrogel and external screen-printed electrodes. It can provide power when flexed and even when it is cut apart. Finally, unlike most batteries, the technology is environmentally friendly, and completely breaks down within four weeks when buried in soil.

Powering wearable health sensors in an effective and sustainable way is a hurdle for the medtech space. Batteries are typically not environmentally friendly, and classically are rigid and bulky – not ideal qualities in a flexible, skin-tight wearable. Wearables are frequently conceived as single use, and the resulting need to dispose of thousands of batteries as such devices are used and discarded adds up to a large environmental footprint.

“Traditional batteries come in a variety of models and sizes, and choosing the right type for your device could be a cumbersome process,” said Fan Hongjin, one of the developers of the new battery technology. “Through our study, we showed a simpler, cheaper way of manufacturing batteries, by developing a single large piece of battery that can be cut to desired shapes and sizes without loss of efficiency. These features make our paper batteries ideal for integration in the sorts of flexible electronics that are gradually being developed.”



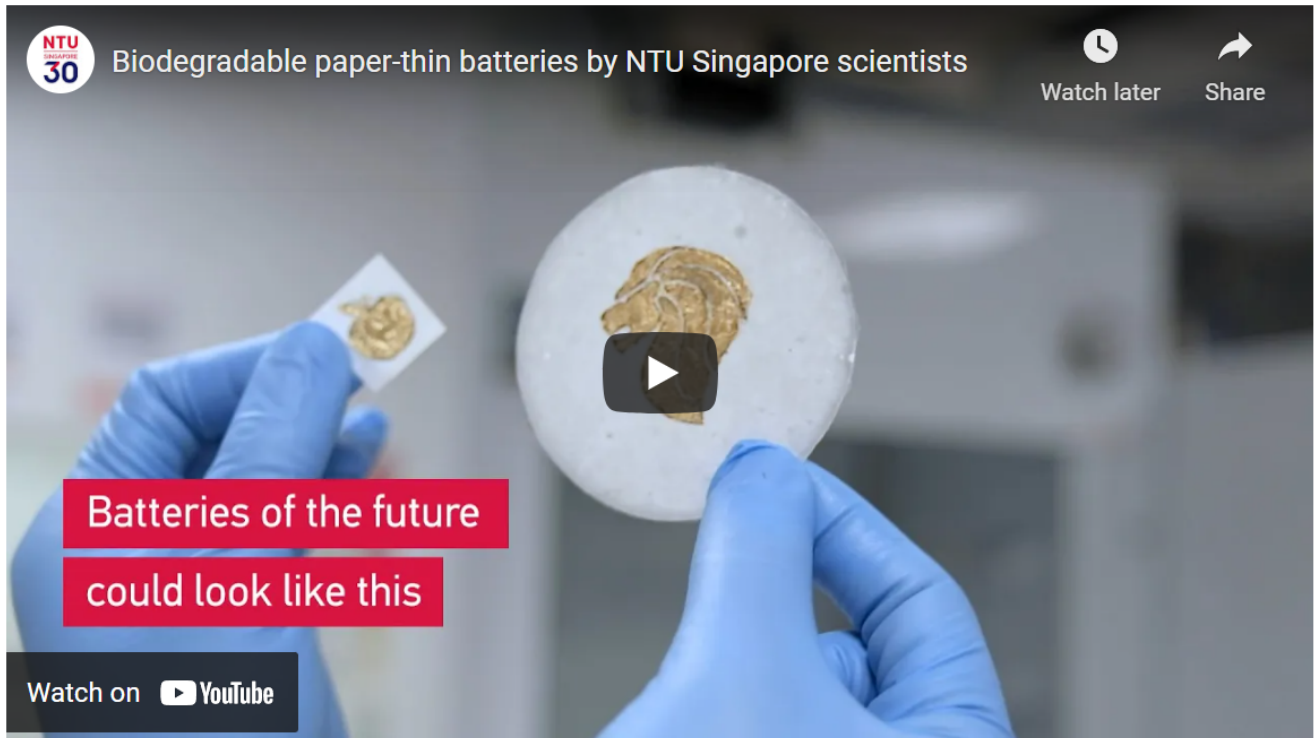
The battery consists of cellulose paper that the researchers have permeated with a hydrogel to strengthen it. They then screen print the electrodes onto either side of the cellulose paper, with the anode ink consisting of zinc and a type of conductive carbon, and the cathode containing either manganese or nickel. Finally, the researchers coat the electrodes with gold foil to increase their conductivity.



“We believe the paper battery we have developed could potentially help with the electronic waste problem, given that our printed paper battery is non-toxic and does not require aluminum or plastic casings to encapsulate the battery components,” said Lee Seok Woo, another researcher involved in the study. “Avoiding the packaging layers also enables our battery to store a higher amount of energy, and thus power, within a smaller system.”

See a video about the battery below.





Study in *Advanced Science*: Printed Zinc Paper Batteries

Flashback: Washable and Flexible Batteries for Wearable Medical Devices

Via: NTU Singapore