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UCT researchers win global award for technology breakthrough

Next wave in innovation likely to be written in electronic ink

UCT professors Margit Härting and David Britton received the Academic R&D Award at the IDTechEx Printed Electronics Europe Awards 2010 in Dresden, Germany, on 13 April, as a result of their groundbreaking work in the field of printed technology. This technology allows electronic ink to be printed onto a substrate (the material on which an electrical circuit is built) where it works as a semiconductor that can carry electrical charges.

The potential applications for printed electronic products are enormous. They range from use in solar cells (where engineers are keen to use thinner and cheaper materials) and animated billboard posters (imagine a paper-thin poster that lights up or runs videos), to packaging (that can guarantee freshness) and smart fabrics (such as shirts that monitor muscle fatigue during sports training).

"The commercial potential is dangerously broad," says Härting. She and Britton beat competitors from some of the world's most illustrious universities in winning the coveted award. Starting with the very basics and working on printed technology in the solid-state and materials physics group in UCT's Department of Physics from the early 2000s, the two have made envelope-pushing advances from the outset.

Among the first was the production of semiconducting inks using silicon nanoparticles – a breakthrough that now underpins the rest of their work. They later became the first scientists in the world to print that nanoparticle ink at room temperature onto paper and other substrates, and have it work as a semiconductor.

Until Härting and Britton's discovery, engineers were stumped by the problem that silicon nanoparticles would react with oxygen in the air and become unusable. They would then have to resort to processes such as sintering, in which particles are bound together by heating them in a furnace. This leads to worries about which materials are suitable as substrates.

For good measure, Britton and Härting's nanoparticle ink was stable in air for two years. "We could do that because we understood the basic physics and material science of our nanoparticles," explains Britton.

Given the ink's countless potential uses, it's little wonder the two researchers have attracted the attention of hordes of potential investors and industrial partners. They have already collected an impressive wad of non-disclosure agreements, reports Britton.

Their location in Africa counted in their favour, says Härting. "In a so-called First World environment, you see things differently," she says. "You go into the stream where everybody else is going. In another environment there are no such influences, and you can go for your own idea."

While they are pursuing commercialisation options – which they cannot name as yet – they're also willing to share their knowledge with others in Africa. In partnership with the United States Agency for International Development, they're hoping to collaborate with universities in Rwanda and the rest of Africa to begin work on those paper-thin solar panels, for example.

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