

Innovation results

AN R&D CASE STUDY

#019

White light burning bright

A new type of lamp that uses an ultra thin polymer coating applied to glass is set to revolutionise lighting in buildings and make the fluorescent tube obsolete.

The need

Lighting accounts for around 20% of the electricity bill in most homes and for as much as 50% of the electricity bills in offices.

The ubiquitous fluorescent lamp is unable to match today's demands for more efficient lighting. Moreover, fluorescent lamps emit sufficient heat to add to the burden of building efficiency and carbon emissions.

So there's a drive to more efficient lighting, but not at the expense of white light quality.

The emerging light emitting polymer technology will prove to deliver light as efficiently as T5 fluorescent and when integrated with renewable energy power generation and novel battery technologies will have a significant positive impact on the environment.

The results

In this Technology Strategy Board co-funded R&D project, Thorn Lighting is leading a consortium to produce a single polymeric material that will emit white light. The idea of project Topless (Thin Organic Polymeric Light Emitting Semiconductor Surfaces) is to apply this material to glass substrates, in a similar fashion to applying paint with a roller.

The resulting layer is ultra thin (just 1/2000th the width of a human hair) and is capable of producing high quality white light when electricity passes through it.

As with all new technologies, the ability to turn exciting laboratory developments into commercially-viable products is the key. It has to be reliable, scalable and produced at a price consumers are prepared to pay.

The products that will arise from project Topless have the potential,

when integrated with renewable power sources, to take lighting off the grid. The light emitting polymer is also incredibly long-lasting and a single kilogram of active material is capable of coating 10,000 square metres of device – two rugby pitches!

The devices are completely recyclable because the lamps will return directly to the glass furnace at end of life. Compare this to fluorescent tubes that, because they contain mercury, are classified as hazardous waste, and require strict handling procedures.

The environmental impact of this innovation is clear. Not only will it reduce energy consumption, it will also reduce waste, cut packaging and shrink the carbon footprint of all premises currently using white lights – which is practically every building in the world.

Next steps

With the technology now proven, Topless is ready to move to production, subject to raising the necessary funding for the pilot manufacturing phase. This will also require continued fundamental material research by the University of Durham and Cambridge Display Technology to continue this work.

Thorn Lighting is now in a position to contemplate manufacturing with the potential to produce up to 9,000

square metres of solid-state lighting per year by 2013, which could then rise exponentially to between a half and one million square metres per year in a high volume production facility by 2016. That is equivalent to 5% of the annual consumption of fluorescent tubes in the UK.

The organic light emitting diode (OLED) lighting market is projected to have revenues reaching \$6bn by 2018.



'The technological advances in lighting, being made in the UK, are setting pulses racing for experts in the field.'

THORN LIGHTING

UK supply chain

The complete supply chain exists in the UK for this technology, from the academic excellence, material scale-up, luminaire manufacture, and all the bolt-on applications such as lighting controls,

packaging and customers. If integrated with renewable power generation, the knowledge and expertise to exploit this is here within the UK (the New and Renewable Energy Centre for instance).

Technology Strategy Board

Driving Innovation

Collaborative research and development projects are one of the tools that the Technology Strategy Board uses to drive innovation in the UK. The Technology Strategy Board is a business-led executive non-departmental public

body, established by the Government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. It is sponsored by the Department for Business, Innovation and Skills (BIS).

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Project partners

Thorn Lighting, Cambridge Display Technology, University of Durham

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