

New flexible smart window with better optical and reliability performance at a lower cost

Summary

Profile type	Company's country	POD reference
Technology offer	United Kingdom	TOGB20230623014
Profile status	Type of partnership	Targeted countries
PUBLISHED	Research and development cooperation agreement	• World
Contact Person	Term of validity	Last update
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General Information

Short summary

A UK startup is testing a unique, patented, bi-stable, liquid-crystal window enabling switching from a highly reflective white or coloured opaque state to a transparent state with no visible haze at any angle. Power is required for switching only. It can reflect heat from a room and control privacy.

Technical collaboration is sought with window manufacturers, chemical synthesis companies and roll-to-roll plastic film manufacturers. However end-users across different sectors are also welcomed.

Full description

Excessive energy use is a global challenge with 60% of global energy used heating/cooling buildings. Around 30% of this can be attributed to windows. New buildings are using more glass windows as a dominant feature which exacerbates the problem and creates further issues including reduced privacy.

A UK University spinout is testing a unique, patented, bi-stable, liquid-crystal window enabling switching from a highly reflective white or coloured opaque state to a transparent state with no visible haze at any angle. See the pictures below. A short electrical pulse is required to switch between opaque and transparent states, but no further power is required. It can reflect heat from a room, control privacy and display text/images to add value to any transparent surface.

The closest competing technology is only available in glass and the cost and time to produce is prohibitive to mass adoption. Widely available polymer dispersed liquid crystals (PDLC) alternatives require power to be transparent, have visible haze, and minimal reflection of heat. Unwanted haze is a major reason why PDLC has not been widely adopted. The UK spinout offers vastly superior performance and also has the capability to be produced significantly faster and cheaper than competing technologies due to the simple and scalable manufacturing process.

Lab results show up to 80% reflection of heat which can reduce a typical household energy bill and CO2 emissions by around 20%. This offers game-changing levels of heat control and efficiency and will help meet UK and international decarbonisation targets. Existing technology is unable to offer this high performance or feature range. The company has proven lamination into glass with 10-15cm demonstrators and now seek to make larger, commercially viable devices around 50cm diameter or in 10-20cm wide strips on a roll-to-roll system. These strips can be joined to form a window-blind effect. The aim here is to de-risk investing in a full-scale production line.

They have simulated the physical and electrical switching mechanisms of the technology which shows these can be scaled-up to commercial sizes. Eventually, solar PV can be integrated into these.

Proposed collaborative projects seek to demonstrate scale-up using an industrial roll-to-roll manufacturing processes to de-risk future production line investment which is typically a roadblock when seeking early-stage investment. Existing research on heat reflection and pixelation will be built upon by validating the concepts and including the innovations within the plastic film demonstrators. This will enable the company to target 5% of the \$15.7b smart-glass market.

Upon successful projects, collaborators will become part of the supply chain or the technology will be licensed to the manufacturers.

Advantages and innovations

The technology can modify glass partitions allowing an open ambience or creating privacy in desired areas without the cost, power-consumption, haze and expense of competing solutions. Since light and heat reflection is tuneable, even in an opaque privacy setting, around 80% of light can propagate into the room. One can also tune the material to block more light if required.

The windows can be pixelated and the picture remains once power is removed. This enables opportunities such as personalised switchable privacy glass (e.g. company logo), advertisement, news updates on windows or adaptable road signs.

Technical specification or expertise sought

Stage of development

Available for demonstration

IPR Status

IPR granted

Sustainable Development goals

• **Goal 7: Affordable and Clean Energy**

Partner Sought

Expected role of the partner

Type of partner sought: industry.

Specific activity of partner: Glass lamination, window manufacturer, chemical manufacturer, automotive or aeroplane manufacturer, consumer electronics manufacturer.

Role of partner sought: The architectural sector is of particular interest. Collaboration and partnership to create a supply chain is sought. The UK company will supply the switchable film or license to the manufacturer.

Longer term projects under technical cooperation are also sought with smart cities and building product developers. Further tests are needed to validate the energy saving aspects under various conditions.

Type of partnership

Research and development cooperation agreement

Type and size of the partner

- **Big company**
- **SME 11-49**
- **SME 50 - 249**
- **SME <=10**

Dissemination

Technology keywords

- **02007007 - Glass**
- **02007002 - Building materials**
- **02007012 - Optical Materials**

Targeted countries

- **World**

Market keywords

- **03001008 - Display panels**

Sector groups involved

Media

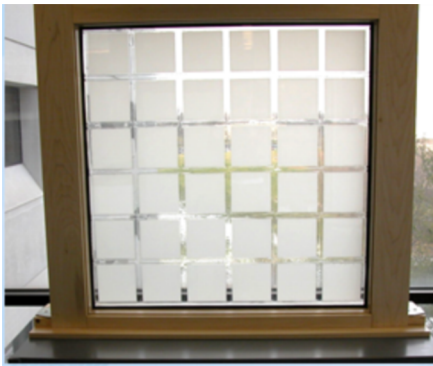
Images



[Picture 2.](#)



[Picture 3.](#)



[Picture 1.](#)