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1 *facade element detail (design: Bára Finnsdóttir, Weißensee art academy Berlin)*

2 *smart clouding (photography: © Wilm Ihlenfeld/fotolia.com retouching facade element: Jessica Rietze)*

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PARTNERSCHAFT FÜR INNOVATION

GEFÖRDERT VOM
Bundesministerium für Bildung und Forschung

INTELLIGENT WALLING WITH SHAPE MEMORY EFFECT

Motivation

Nearly 40 percent of the total energy consumption in Germany is caused by the housing sector. Heating, cooling and ventilation of houses, office buildings and public buildings is expensive. True energy squanderer are office buildings with large-area glass facades.
In summertime they turn into greenhouses. In winter, the heating demand is growing rapidly due to insufficient insulation of glass surfaces.
To reduce energy consumption, researchers of the Fraunhofer Institute for Machine Tools and Forming Technology IWU in Dresden are developing in cooperation with the Department of Textile and Surface of the Berlin Weissensee School of Art wall components that react autonomously to sunlight and the heat thereof.

Approach

The demonstrator, which is based on a draft of the design student Bara Finnsdottir, consists of a matrix of 72 individual textile components that look like blossoms.
Integrated into the fabric modules are shape memory actuators.
These thin, 80 mm long wires do remember when heated to its original shape.
If the facade heats up by sunshine, these wires from a nickel-titanium alloy can be activated; they contract and therefore open noiselessly the textile components.
The open area of the facade element is getting closed and the sunlight cannot penetrate into the room. When the sun disappears behind the clouds again, the elements close and the façade is transparent again.