



WAGENINGEN UR
For quality of life

Developing the finest greenhouse covering material for all applications

Wageningen UR Greenhouse Horticulture

To be able to make the best use of natural sunlight, greenhouse covering materials must have an ideal combination of light transmittance and insulation value. This is one of the specialisms of Wageningen UR Greenhouse Horticulture, which develops innovative materials together with industrial partners. The institute studies the effect of material properties on the usability of coverings. We also support our partners by making the greenhouse covering materials ready for the market.

Optimisation

By adapting the material properties to components, both the intensity and the spectrum of the transmitted light can be optimised for existing materials. In light of long term developments, entirely new materials are studied for possible use as 'intelligent greenhouse covering'.

Increasing light intensity

One way in which the total amount of light transmission by greenhouse covering materials can be increased is by applying special surface coatings or changing the surface structure.

A specific result of our research in this field is the recently introduced zigzag sheet, which we developed together with General Electric Plastics. This polycarbonate sheet combines heat insulating characteristics with a high degree of light transmission.

Changing the light spectrum

Specific coatings and additives can bring about a change in the greenhouse covering material's transmittance of certain parts of the solar radiation spectrum. In this way, energy management and crop

growth can be steered in the desired direction. Changing the UV-transmittance, for example, can clearly impact crop morphology, the colour of the flowers and the behaviour of insects and fungus in the greenhouse.

This is the reason why producers of masterbatches and raw materials work together with us on greenhouse covering materials that transmit light in a specific spectrum that is adapted to the needs of the plants. In addition, we also carry out research into the possibilities of wavelength specific fluorescence, interference, absorption and reflection.

Studying the benefits of keeping the greenhouse temperature as low as possible in the summer months, the institute has been working in an international setting to lower the transmitted Near InfraRed (NIR) radiation. This is particularly important for regions with higher outside temperatures.

When it is cold or there is limited solar radiation, the retention of greenhouse warmth is a crucial challenge. For this reason, we are working with suppliers of raw materials, optimising the thermal properties of the plastic films that are applied on greenhouses.

Nanotechnology

As you would expect from a research institute, we enjoy thinking outside the box, especially concerning the development of entirely new materials. One of the materials that is currently being studied with our partners is the so-called nanofoam. This foam has 'cells' in a size that are shorter than the wavelengths of light. Consequently the material is able to transmit light and has a high insulation value. The expectation is that nanofoam will offer twice as much insulation as double glazing. In addition to greenhouses, it could also be applied in solar collectors and for insulating transparent panels.



For more information:

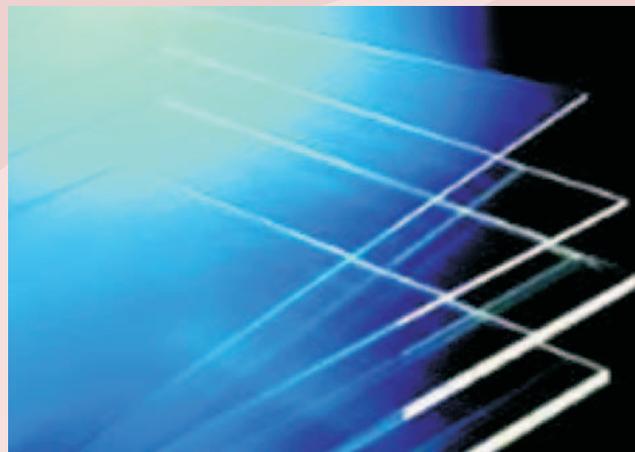
Piet Sonneveld, piet.sonneveld@wur.nl, +31 317 48 33 83
Silke Hemming, silke.hemming@wur.nl, +31 317 48 69 21
Wageningen UR Greenhouse Horticulture
P.O. Box 20, 2665 ZG Bleiswijk, The Netherlands
www.glastuinbouw.wur.nl/uk



Energy saving materials for covering and screening greenhouses

Our work with various industrial partners also incorporates the area of energy saving materials for covering and screening greenhouses. Priority is given to optimise the combination of light transmittance and insulation value. Also taken into account are the overall effects on the greenhouse climate, the UV and NIR transmission, the changing light spectrum and crop reactions. The possibilities of producing materials in large quantities is another issue.

Our partners include: General Electric Plastics BV, Ashahi Glass Europe.



Spectrafoil

Optimising the spectral light transmittance of horticultural foils depending on the lighting needs of the crop and the regional climate outside. Developing and testing fluorescent materials, UV- and NIR-absorbing materials.

Partners: Wageningen UR, Grafe Color Batch (D), Palrig (IL), Sunsave (E), several market gardeners (IL, CY, E, NL), Agricultural Research Organisation ARO (IL), Agricultural Research Institute ARI (CY), TITK (D).

Goal: Optimal greenhouse covering and screening materials for all applications.

Anti-reflection coated glass

Research on the possibilities of using anti-reflection coated glass in horticulture in an economical way. The glass has a very high light transmittance, which raises fruit vegetable production. When this material is applied as a double covering this can result in substantial energy savings.

Partners: Wageningen UR, CentroSolar, Hogla, Sunarc Technology, Asahi Glass Europe

Financing: Product Board for Horticulture, Dutch Ministry of Agriculture, private industry

Goal: Increasing amount of light transmitted by glass.

