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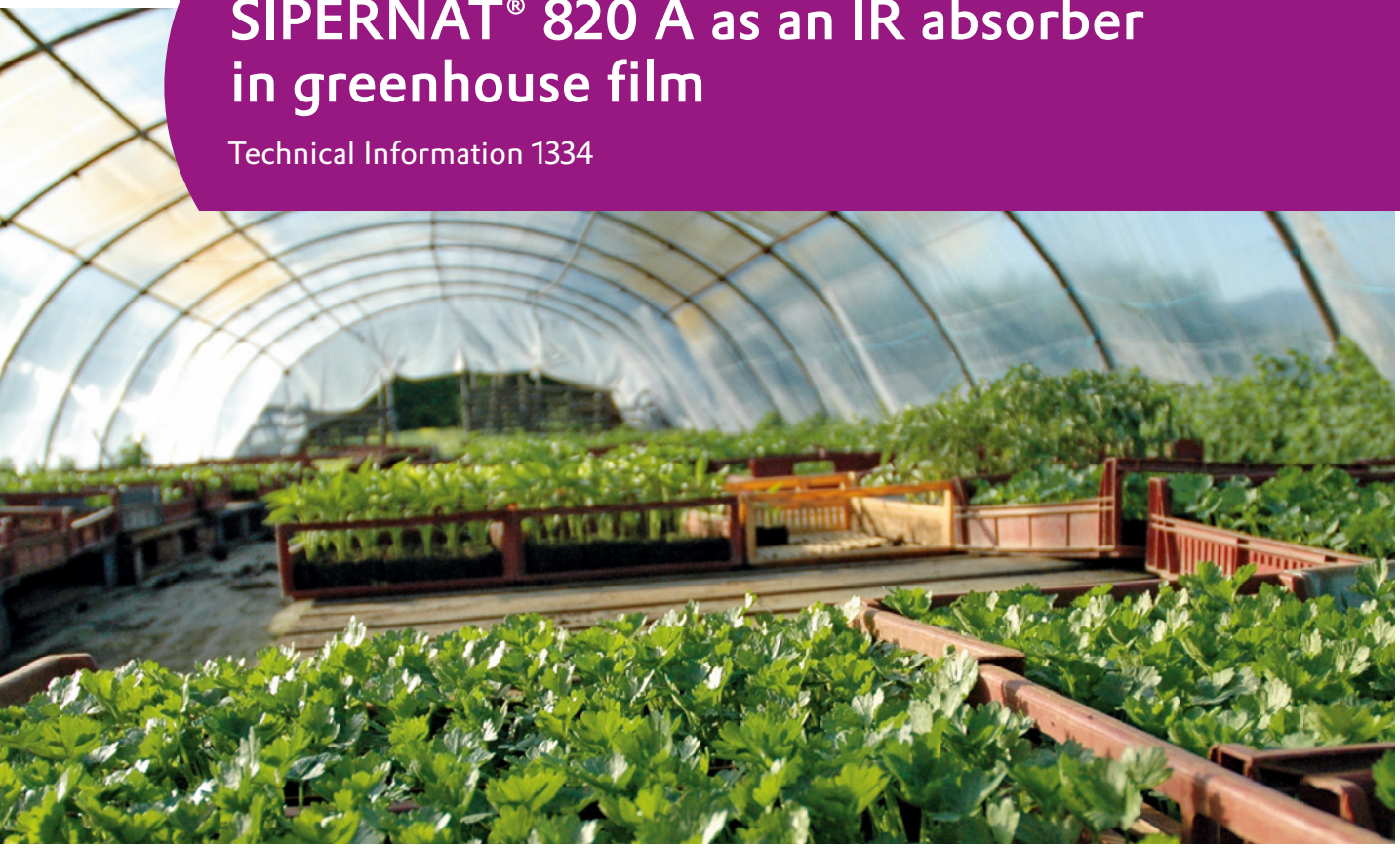
SIPERNAT® 820 A as an IR absorber in greenhouse film

Technical Information 1334



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Greenhouse film has become an indispensable material in modern agriculture because it creates an optimum climate for crop growth and hence additional yields from out-of-season production. Through the use of additives, specific film properties can be selectively improved, for example, reduced IR radiation transmission. As a result, the heat generated by a greenhouse can be stored more efficiently and the loss due to thermal radiation can be reduced considerably.

The addition of SIPERNAT® 820 A is an effective and low-cost way of improving the thermal barrier properties of polyethylene films. SIPERNAT® 820 A is a very fine-particled synthetic aluminium silicate. Typical concentrations used in greenhouse films range from approx. 3 % to 7 % by weight.

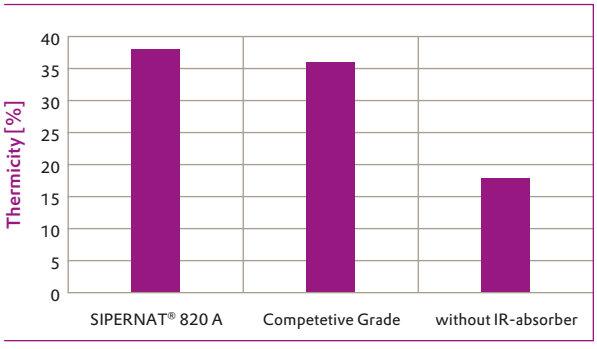
Properties of SIPERNAT® 820 A in greenhouse film:

- High heat retention in the greenhouse (high thermicity)
- High light transmission
- High purity and hence minimal interaction with UV stabilisers
- Additional potential application: carrier for other additives (e.g. anti-drop)
- Simple integration via master batch

SIPERNAT® 820 A absorbs the thermal radiation hitting the polyethylene film and thus allows a higher temperature inside the greenhouse.

The level of IR efficiency (thermicity) was determined in accordance with the standard EN 13206.

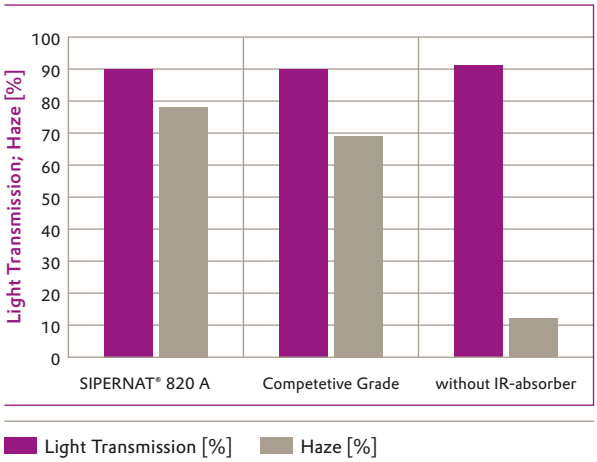
Figure 1
Thermicity of PE-film containing 3 % SIPERNAT® 820 A



The light transmission of the polyethylene film remains virtually unchanged by the use of SIPERNAT® 820 A. By scattering the light on silicate particles the haze of the film increases to a certain extent. The light-diffusing effect of the film can also be a desirable side effect, depending on the field of application and climatic conditions.

The optical data was determined in accordance with DIN 5036, Part 3.

Figure 2
Light Transmission and Haze of PE-film containing 3 % SIPERNAT® 820 A



Figures 3 and 4 show the physical principles for increasin ty of polyethylene films by the use of SIPERNAT® 820 A. As can be seen from transmission curves, the aluminium silicate features a highly pronounced absorption band in the wavelength range of approx.
1000 to 1300 cm^{-1}.

The measurement of the Thermicity according to standard EN 13206 includes the wave numbers ranging from 770 cm^{-1} to 1430 cm^{-1}, which corresponds to the emission range of thermal energy radiated from the earth's surface.

Figure 3
PE-film without IR-Absorber

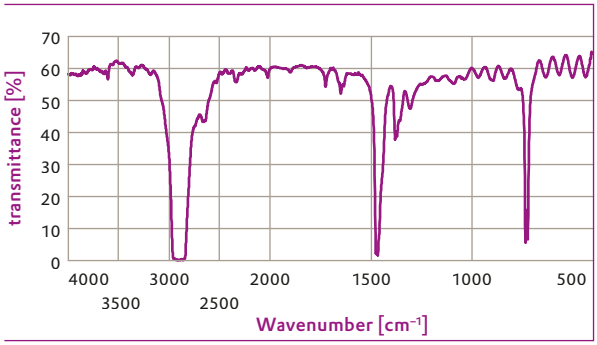
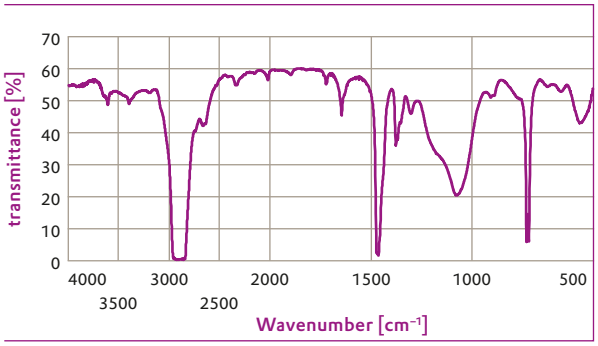


Figure 4
PE-film with 3 % SIPERNAT® 820 A



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