

SUMMARY

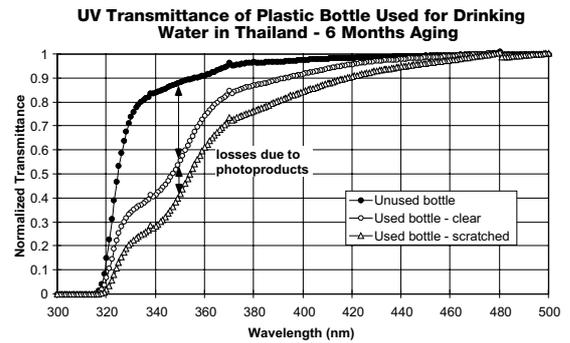
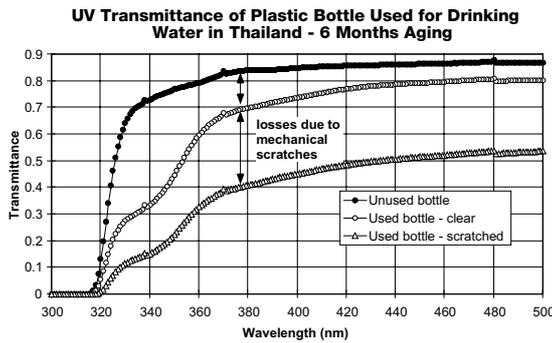
SODIS bottles are used daily and for a long period of time. Ageing of the PET-bottles leads to a reduction of UV-transmittance which, in turn, can result in a less efficient inactivation of microorganisms. The additives in the PET material, which are used to protect it from degradation by sunlight, have no influence on the water quality, since at the inside of the bottle no photoproducts are generated.

Transmittance Losses

Ageing of the bottles leads to a reduction of UV-transmittance which, in turn, can result in a less efficient inactivation of microorganisms. The figure below illustrates the UV transmittance for used and unused

To improve their stability, additives are widely used to protect them from oxidation, UV radiation effects, weathering etc. In the course of the polymer's life, the additives will be depleted from the host material by photochemical reaction or diffusion. This can greatly

BACKGROUND INFORMATION

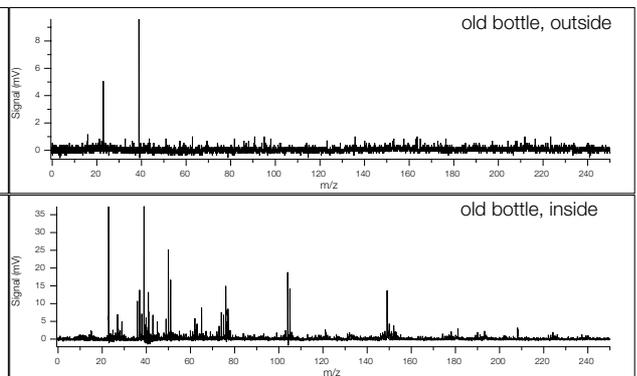
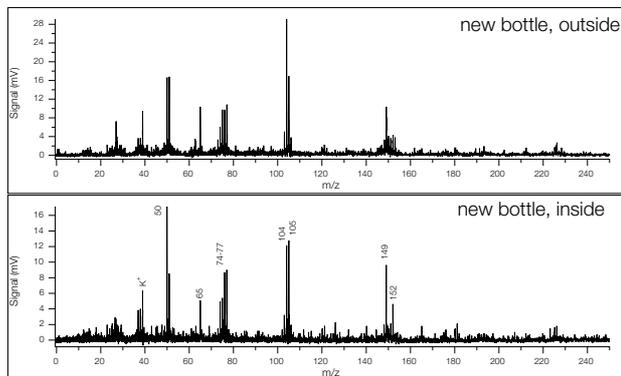


bottles. The figure on the left shows the transmittance losses due to mechanical scratches whereas the figure on the right illustrates the losses due to photoproducts. Smooth and careful cleaning is necessary to avoid mechanical scratches.

influence the properties of the material. The figure below illustrates the difference between new and old bottles exposed to sunlight for 6 months. The outer surface of the bottles clearly indicates the difference between a new and an old bottle. Hardly a difference is, however, visible between the inner surface of the old and the new bottle in the mass spectrum. Since the inner surface of the bottle does not seem to be affected by UV radiation, it is very unlikely that photoproducts of polymer additives will pollute the treated drinking water and cause health problems.

Photoproducts

PET, like all polymeric materials, undergoes reactions with oxygen or degradation under sunlight. The UV A and B components of sunlight in the 290-400 nm wavelength range lead to photochemical reactions resulting in optical and mechanical property changes.



REFERENCES

SODIS News No. 3, October 1998. p. 13-14
<http://www.sodis.ch> [R13]
 Zahn, Q., et al. (1996). Spatially Resolved in-Situ Analysis of Polymer Additives by Two-Step Laser Mass Spectrometry. *Macromolecules*, 1996, **29**, 7865-7871. [P7]