
Influence of visible light to wood surface degradation and wood surface photostabilization

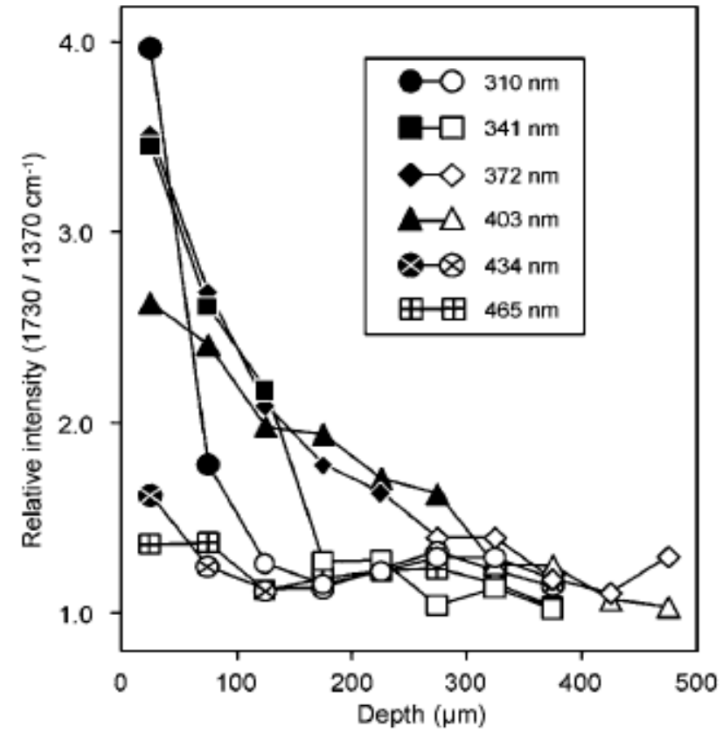
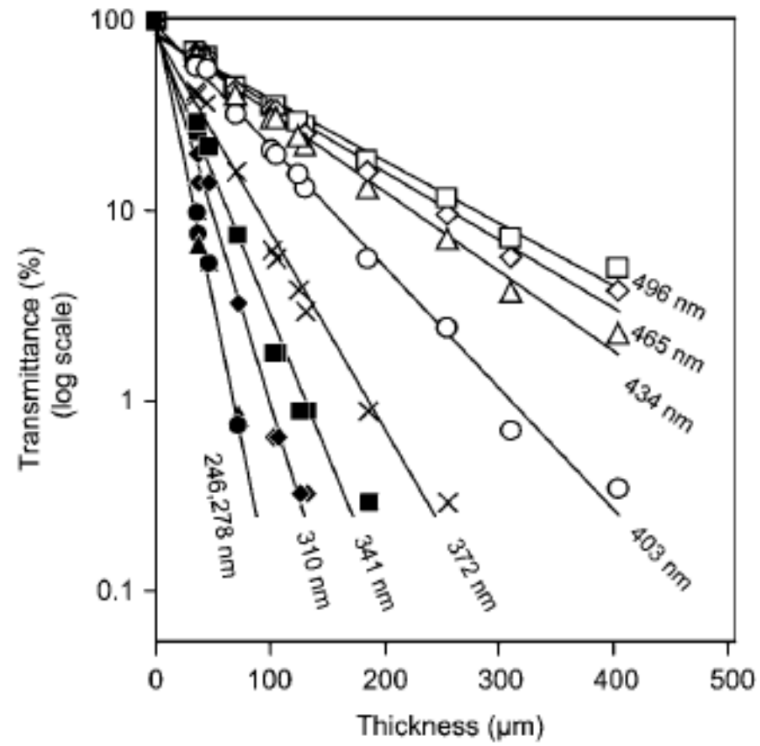
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Final COST FP1006 meeting
“Advances in modified and functional bio-based surfaces”
Aristotle University of Thessaloniki,
Thessaloniki, Greece, 7-9 April 2015

Introduction

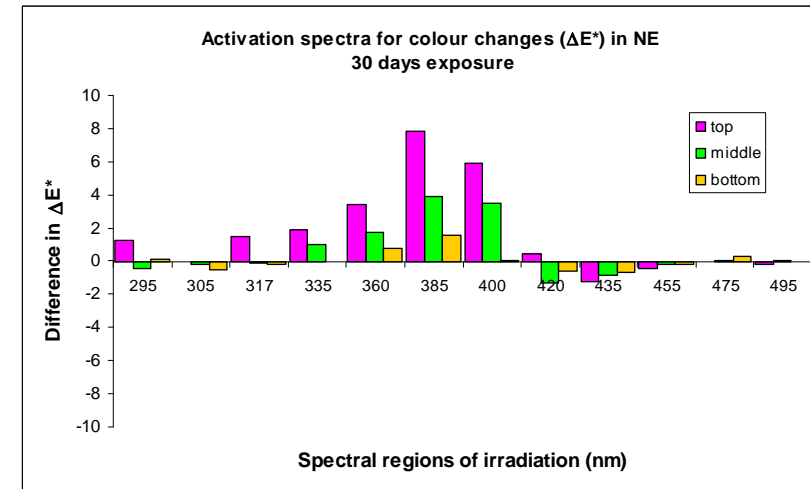
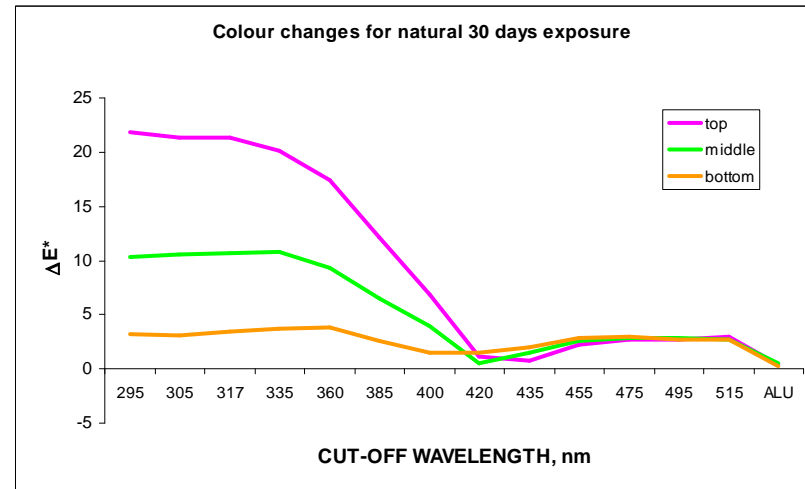
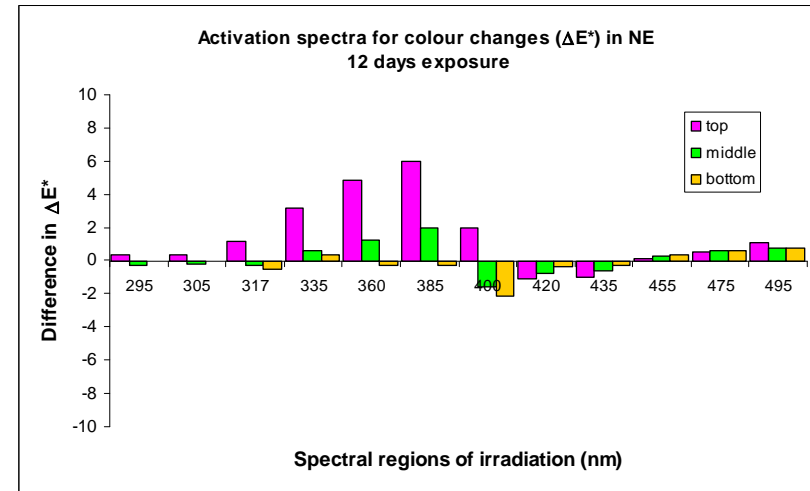
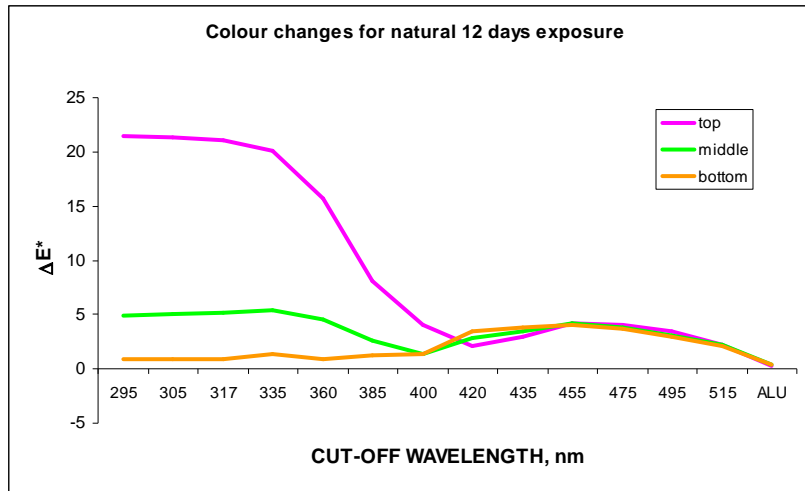
- sharp cut filter method
 - better reflects the conditions of natural exposure
 - interaction of the effects
 - greater size of specimens
 - optical, mechanical and chemical measurements
- spectrographic technique
 - better resolution
 - no synergistic or antagonistic interactions
 - no natural influences (temperature, humidity, liquid water)
 - small specimen

Introduction



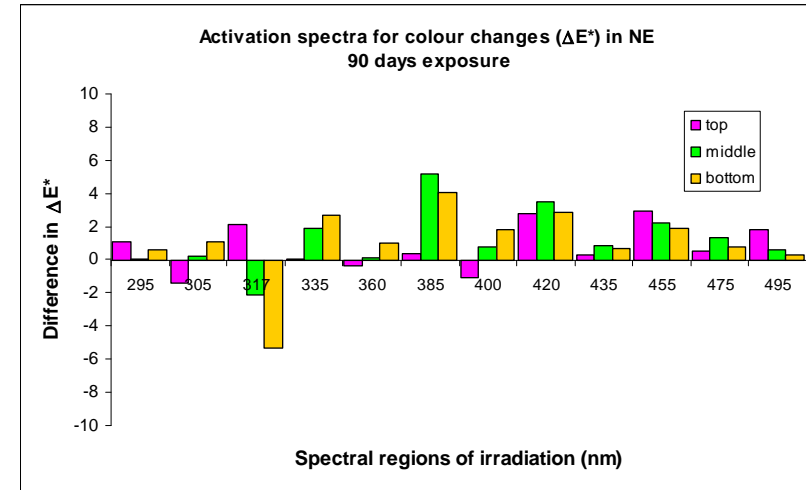
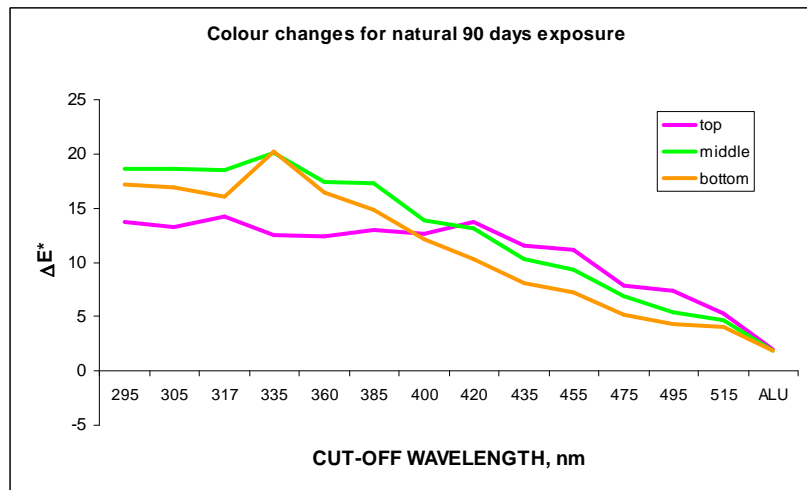
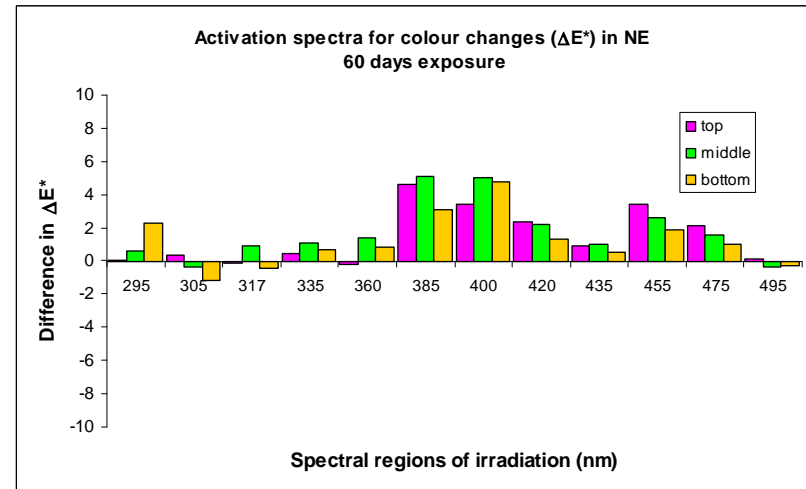
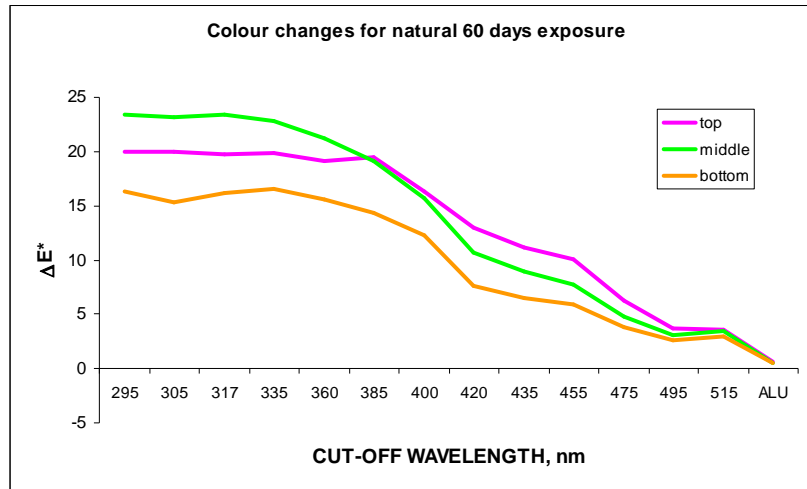
Natural exposure

COLOUR CHANGES

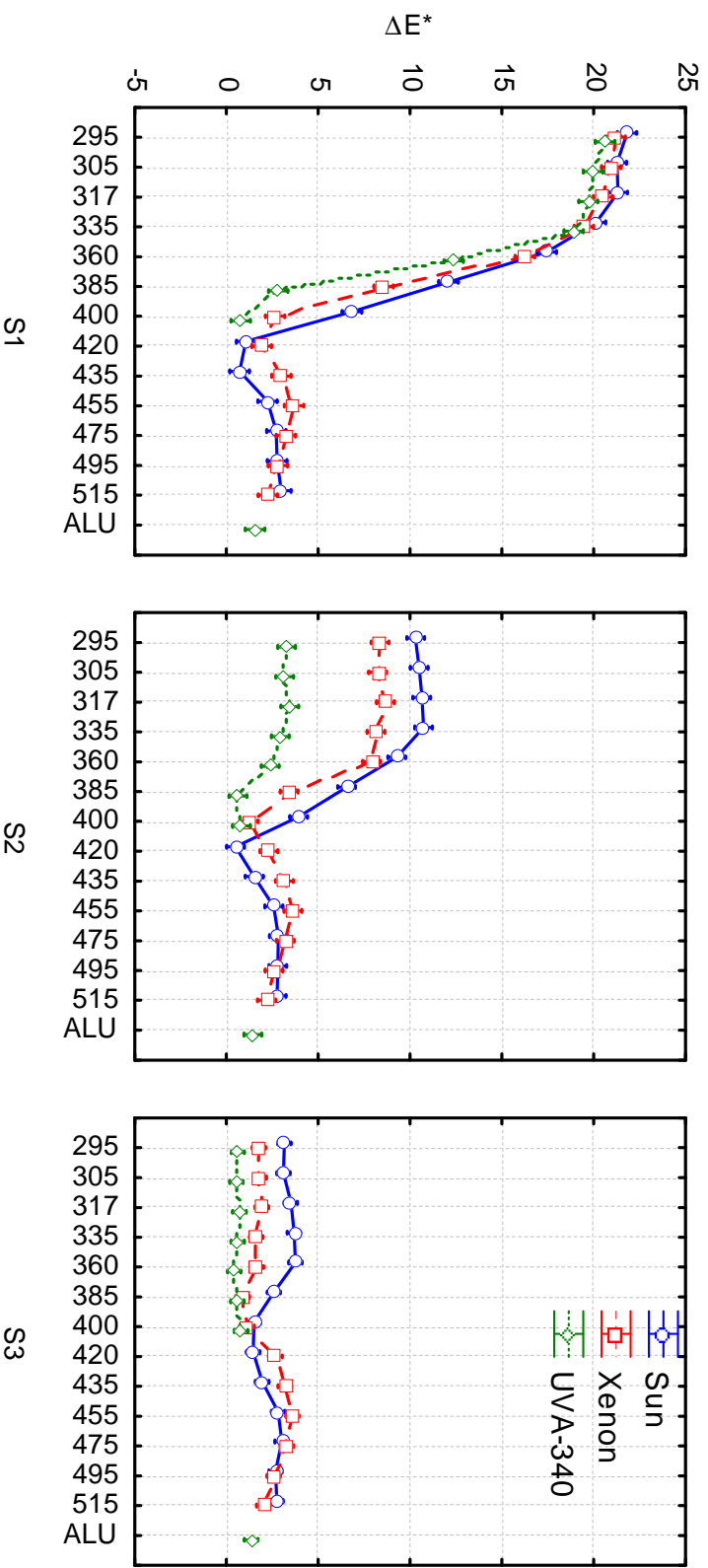


Natural exposure

COLOUR CHANGES

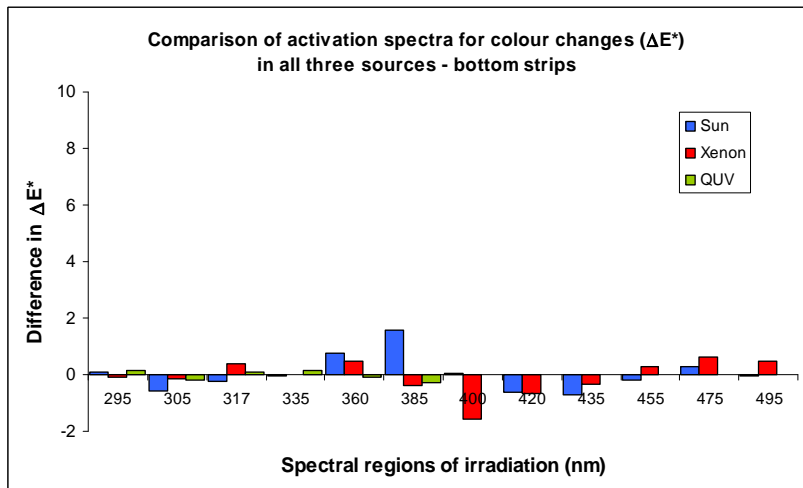
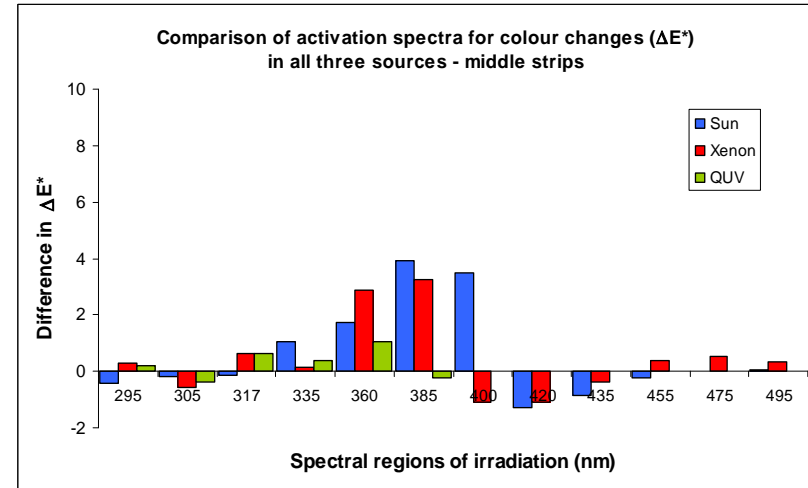
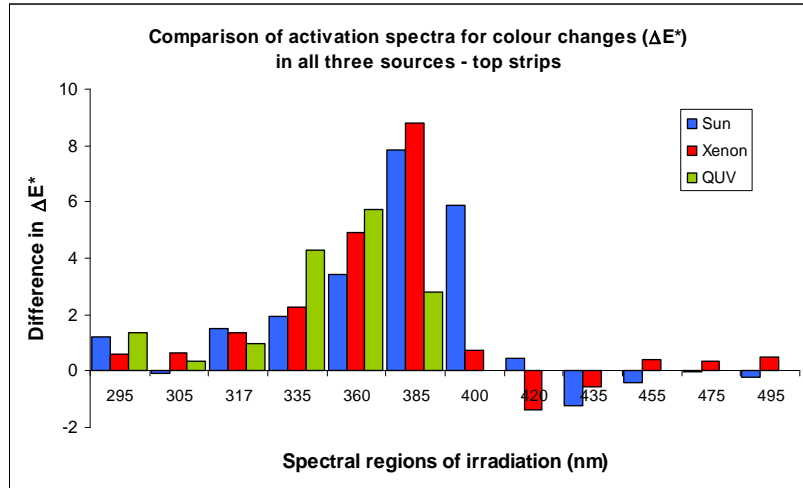


Colour changes



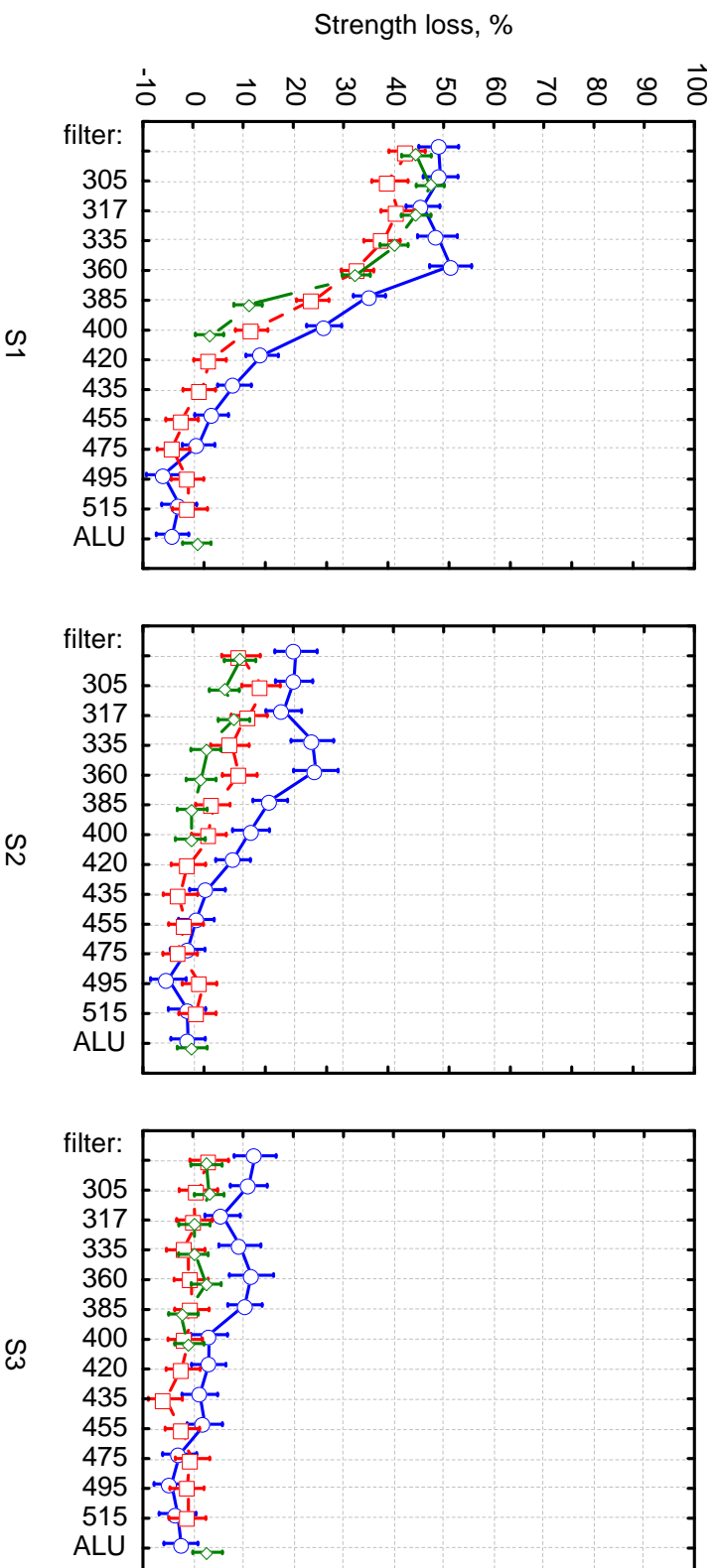
$\Delta E^*_{max} \approx 22$

Activation spectra for colour changes

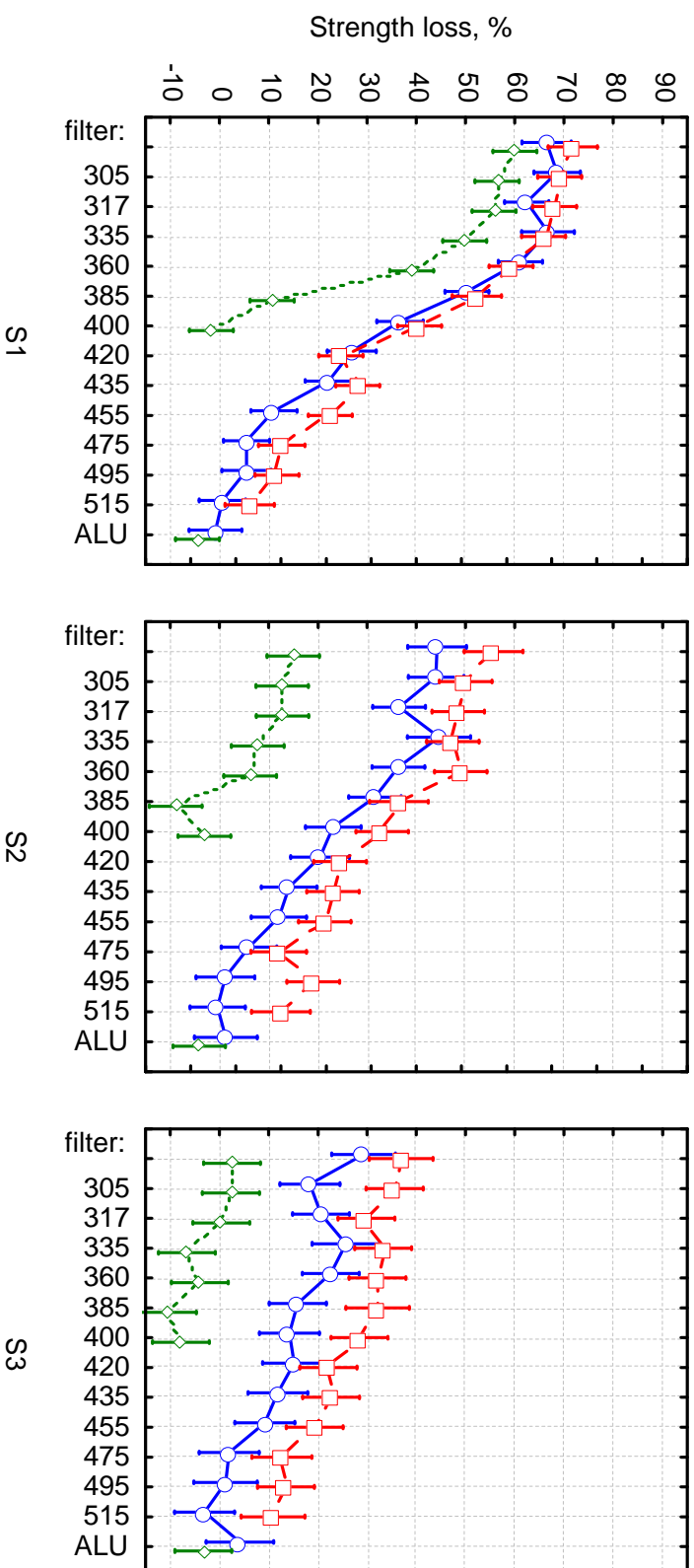


- 295-335 nm – small influence to AS
- 335-400 nm most pronounced influence
- >400nm active in NE only

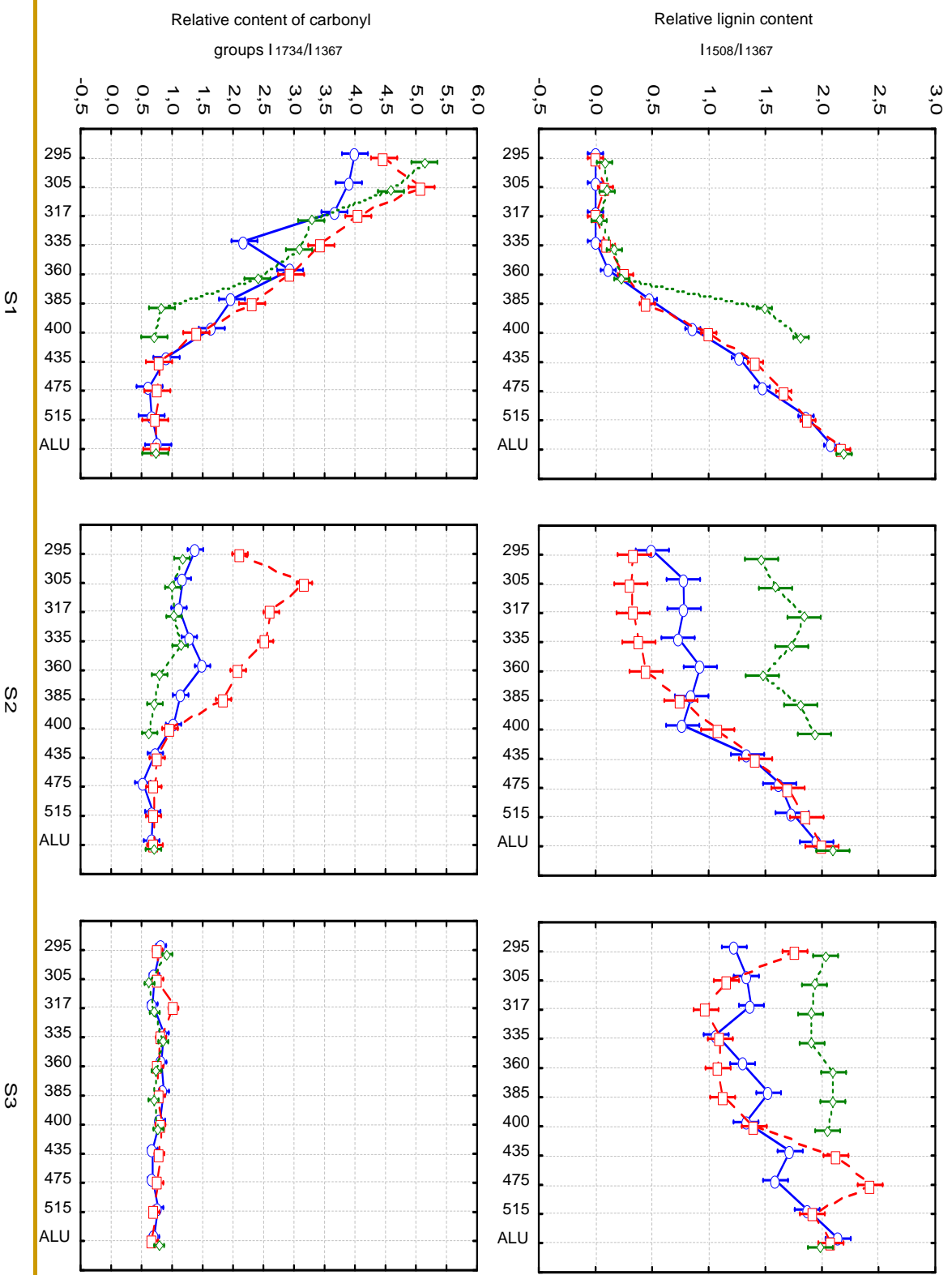
Micromechanical changes at 0 span



Micromechanical changes at 10 span



Chemical changes



(CONCLUSIONS)

- Discoloration was faster in early phases, finite span strength reached saturation in the middle; zero strength and chemical changes reached maxima at the ends of exposures.
- Most influential wavelengths could be best identified in the moment of the maximum change.
- Trend of colour changes and appearance of samples after exposure to xenon resembled to exposure out of doors.
- Exposure to UV source caused intensive acceleration of changes of the top layer and very shallow profile of changes.
- Wavelengths between 360 and 435 nm caused greatest proportion of damages, but visible light of wavelengths up to 510 nm contributed significantly to surface damages.