

Supporting Information

Photochromic behavior of ZnO / MoO₃ interfaces.

Ines Andron,†, ‡ Léa Marichez, † Véronique Jubera,† Christine Labrugère, † Mathieu Duttine, † Christine Frayret, ‡ Manuel Gaudon†,*.

† CNRS, Univ. Bordeaux, Bordeaux INP, ICMCB, UMR 5026, F-33600 Pessac, France

‡ Laboratoire de Réactivité et de Chimie des Solides (LRCS), CNRS UMR 7314, Université de Picardie Jules Verne, 80039 Amiens, France

Corresponding Author

*Corresponding authors: manuel.gaudon@icmcb.cnrs.fr

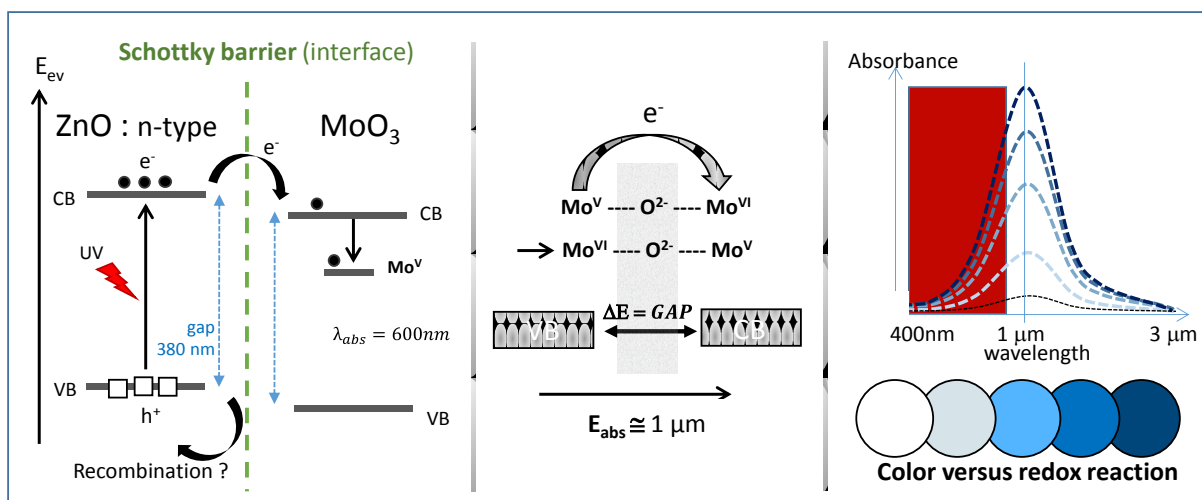


Figure S1: Band gap scheme of ZnO and MoO₃ oxides and Schottky barrier with electron transfer from ZnO to MoO₃ conduction bands, intervalence charge transfer in MoO₃ (where oxo-bridges are represented per analogy with a forbidden gap) and power/film color obtained versus the intervalence charge transfer density (photo-redox reaction advancement).

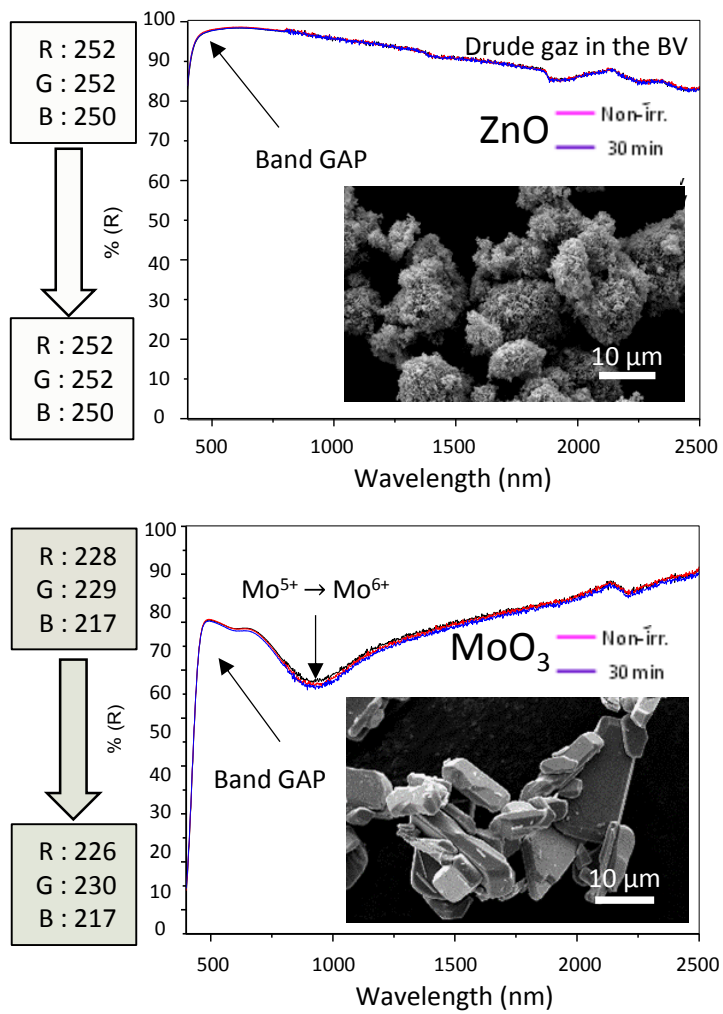


Figure S2: Reflectance spectra and color of the ZnO and MoO₃ oxides at virgin state and after 30min. irradiation. SEM pictures of the two raw oxides are also joined.

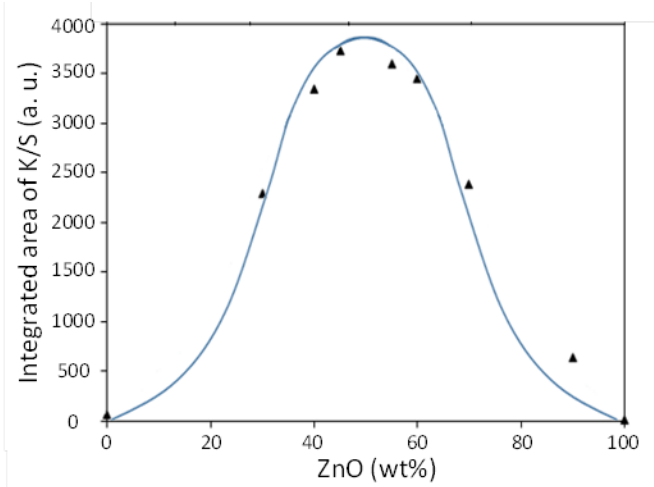


Figure S3: K/S integrated absorbance (400-2500 nm) reached after 3 hours irradiation (saturation stage of the photochromic effect) vs the ZnO wt% into the MoO₃/ZnO mixture.

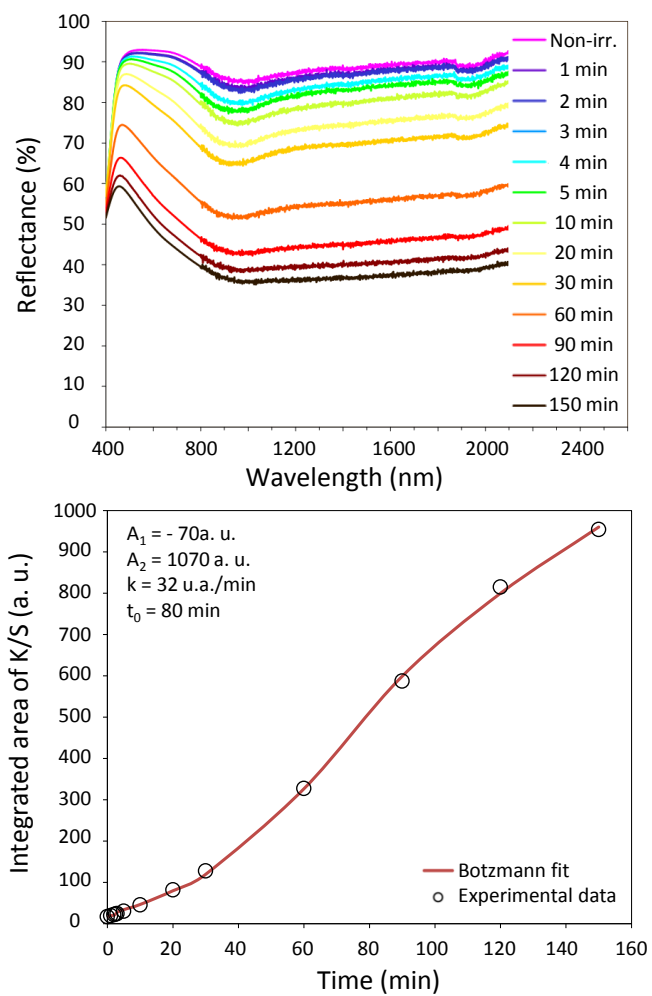


Figure S4: Evolution of the reflectance spectra of the mixture prepared with gravitational impact mills versus UV-light excitation time and evolution of the total K/S absorbance (400-2500 nm) vs irradiation time.

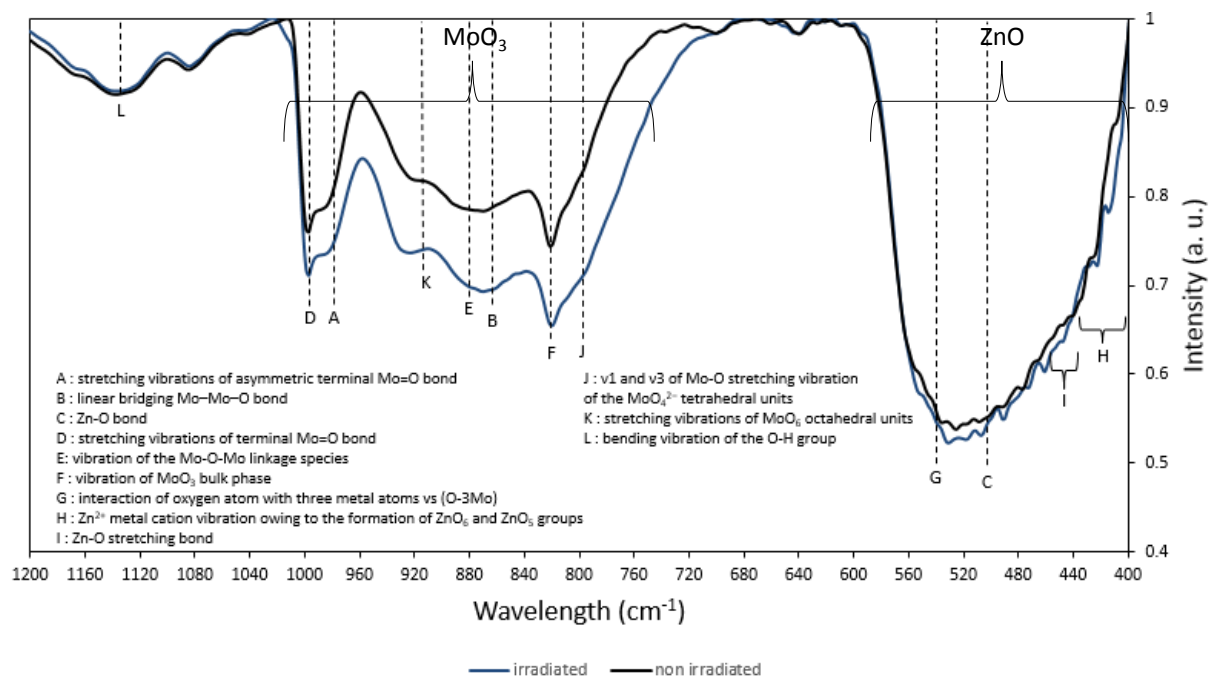


Figure S5: Infrared spectra of the ZnO / MoO₃ mixture before and after 3 hours UV-light irradiation.

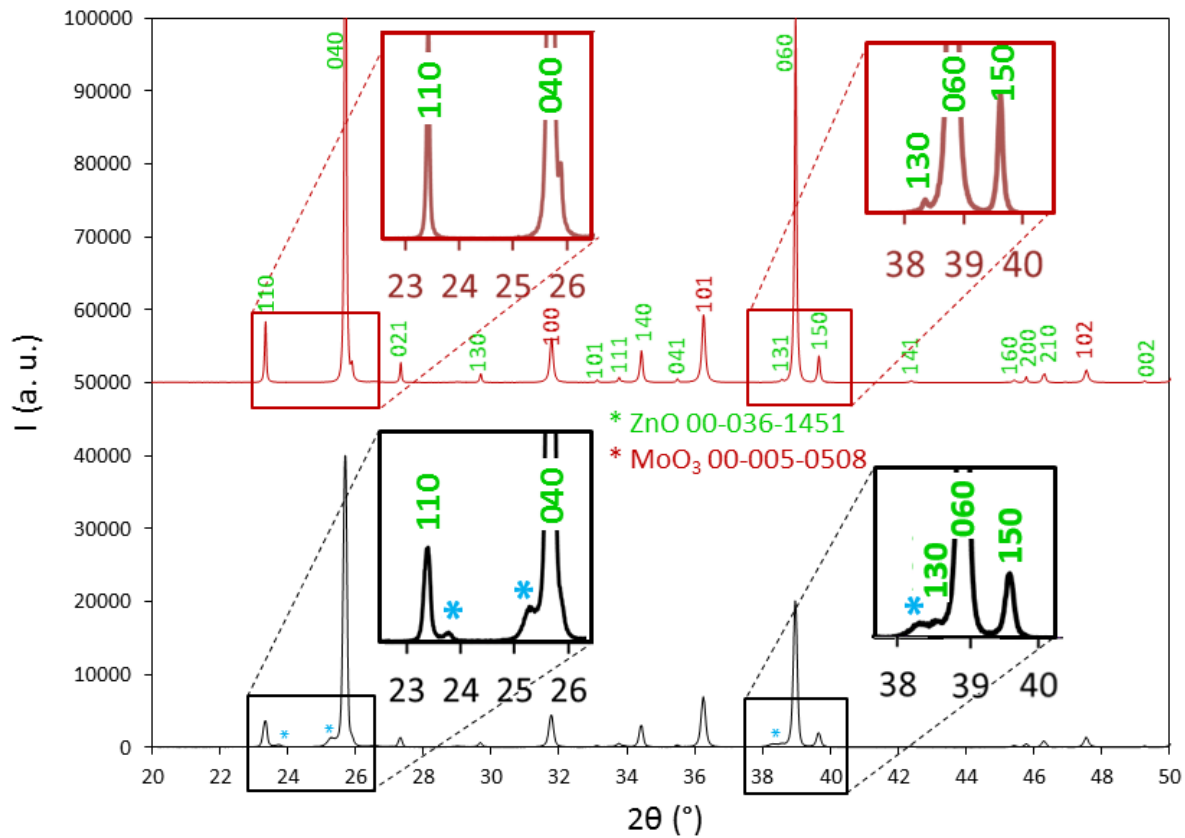


Figure S6: X-ray diffraction patterns of the ZnO / MoO₃ mixture before irradiation (virgin state) and after 12 hours UV-light irradiation.

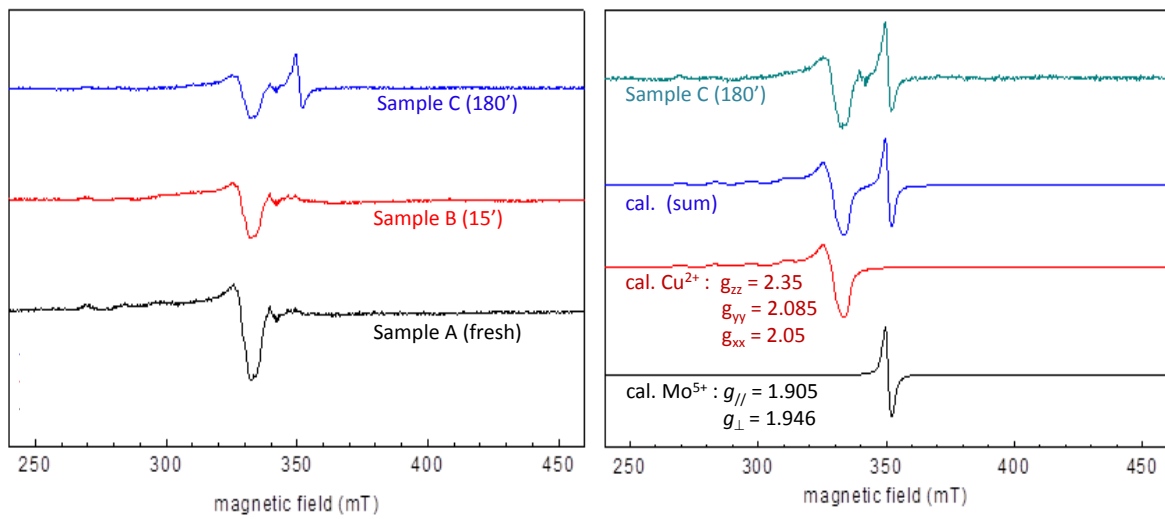


Figure S7: EPR spectra of the ZnO / MoO₃ mixture before, after 15 min and after 3 hours UV-light irradiation.

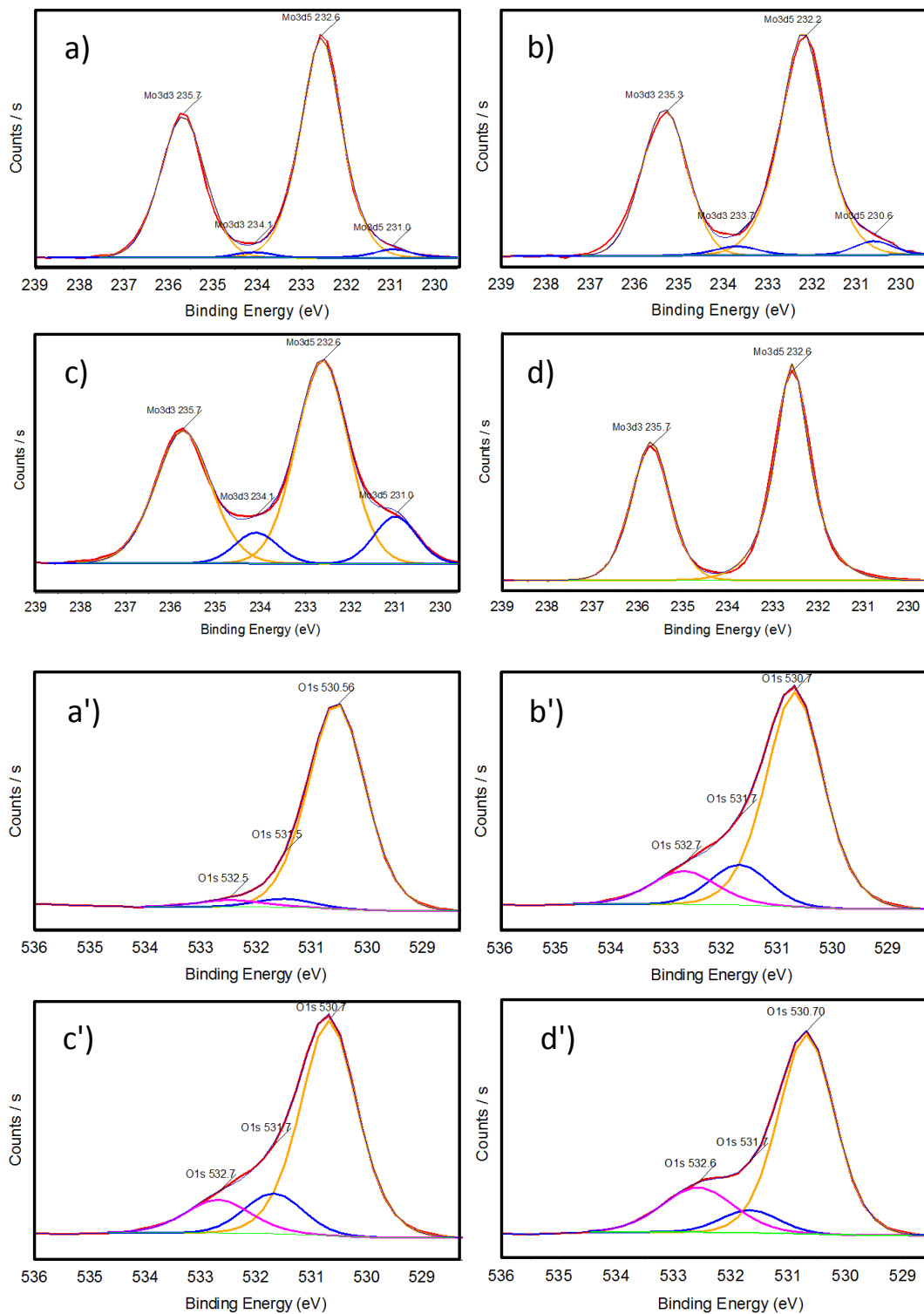


Figure S8: XPS spectra of Mo 3d region (red signal for Mo⁶⁺ doublet at 232.6 and 235.7 eV and blue signal for Mo⁵⁺ doublet at 230.6 and 233.7 eV) recorded on fresh MoO₃-ZnO mixture (a), 15 min irradiated mixture (b), 3 hours irradiated mixture (c) and pure MoO₃ as reference (d) ; XPS spectra of O 1s region recorded on MoO₃ as pure reference (a'), MoO₃-ZnO fresh mixture (b'), 3 hours irradiated (c') and pure ZnO as reference (d').

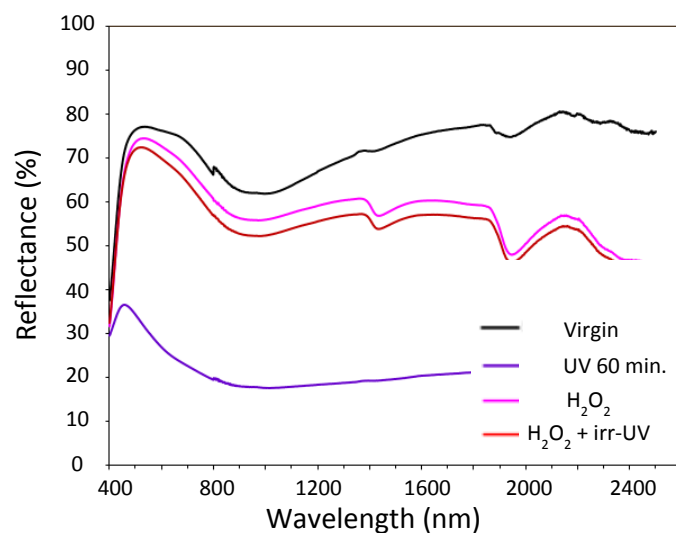


Figure S9: Reflectance spectra on ZnO/MoO₃ virgin mixture, after UV-light irradiation (60 min.), on this latter sample previously UV-light irradiated after using H₂O₂ for forced-bleaching process and after a 2nd cycle photochromic excitation (produced from additional 60 min UV-light irradiation).

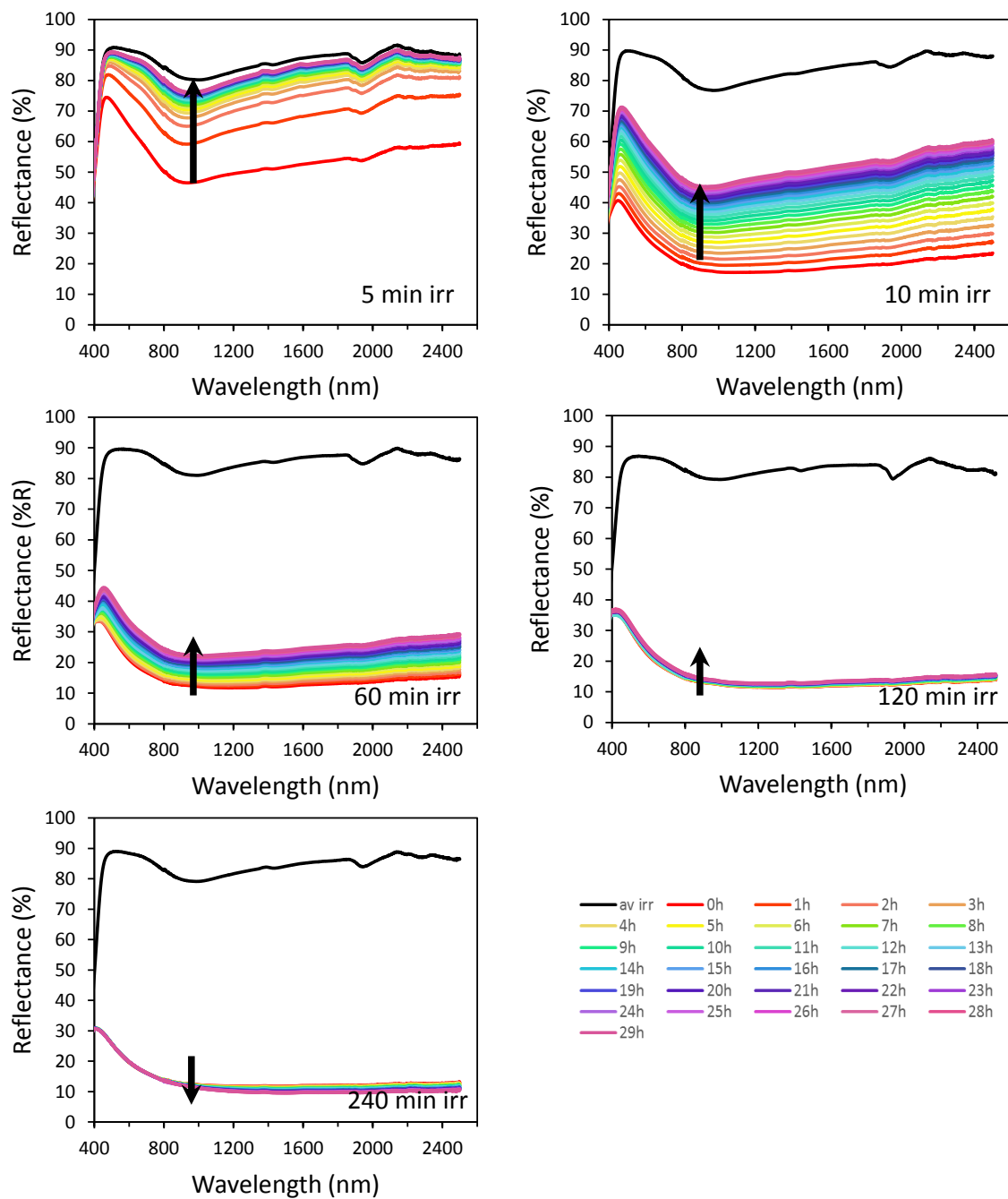


Figure S10: Evolution of the K/S transforms vs bleaching time for samples previously irradiated 5 min. (i), 10 min. (ii), 30 min. (iii), 1 hour (iv) and 2h30 (v).