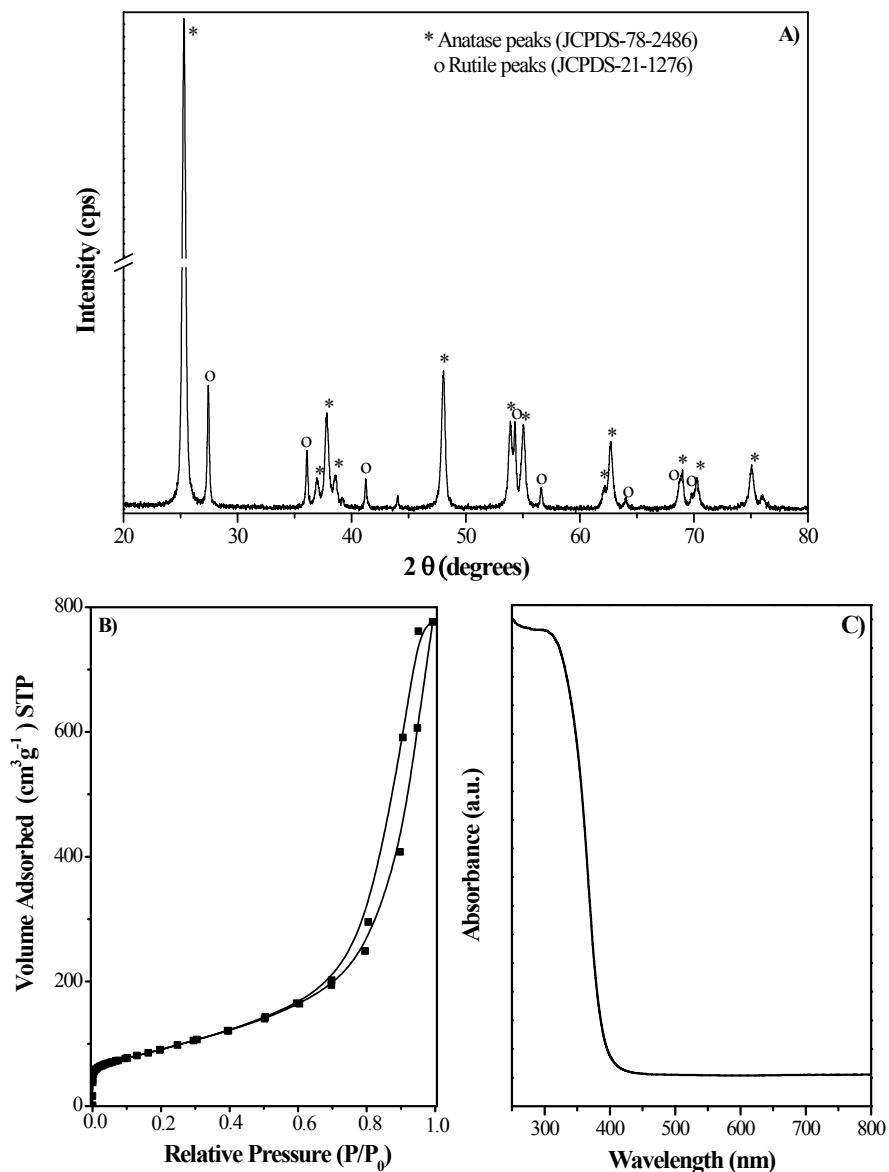


Supplementary Material

Photostability and photocatalytic degradation of ionic liquids under solar light

*J. Bedia**, *J.J Rodriguez*, *D. Moreno*, *J. Palomar*, *C. Belver*

Figure S1. XRD pattern (A), $-196\text{ }^{\circ}\text{C}$ N_2 adsorption-desorption isotherm (B) and UV-vis



diffuse absorbance spectrum of the commercial TiO_2 (Aeroxide@P25).

Characterization techniques description: X-ray diffraction (XRD) pattern was recorded on a Bruker D8 diffractometer with a scintillation detector, using $\text{Cu-K}\alpha$ source, with a scan step of $1^{\circ}\cdot\text{min}^{-1}$ between 20 and 80° of 2θ . N_2 adsorption-desorption at $-196\text{ }^{\circ}\text{C}$ was carried out using a Micromeritics TriStar 123 static volumetric system. The sample was previously outgassed under vacuum at $150\text{ }^{\circ}\text{C}$ overnight in a Florprep 060 Micromeritics device. Shimadzu 2501PC UV-vis spectrophotometer was used to record UV-vis diffuse reflectance spectrum (UV-vis DRS) in the 250–800 nm region using BaSO_4 as reference material.

Figure S2. Molecular model of ion independent (C+A) and ion-pair (CA) for IL (example: [Bmim][Cl])

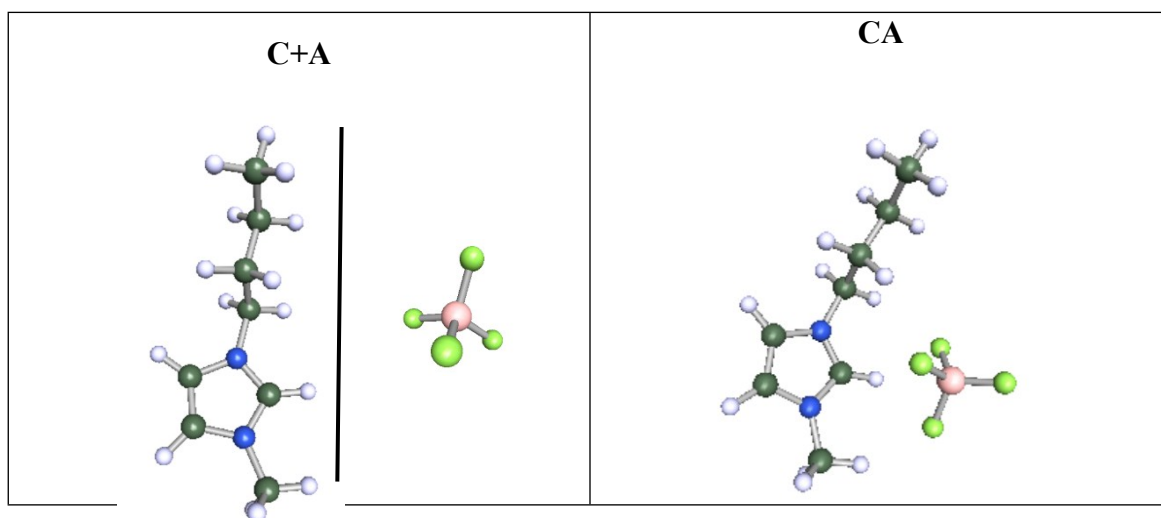
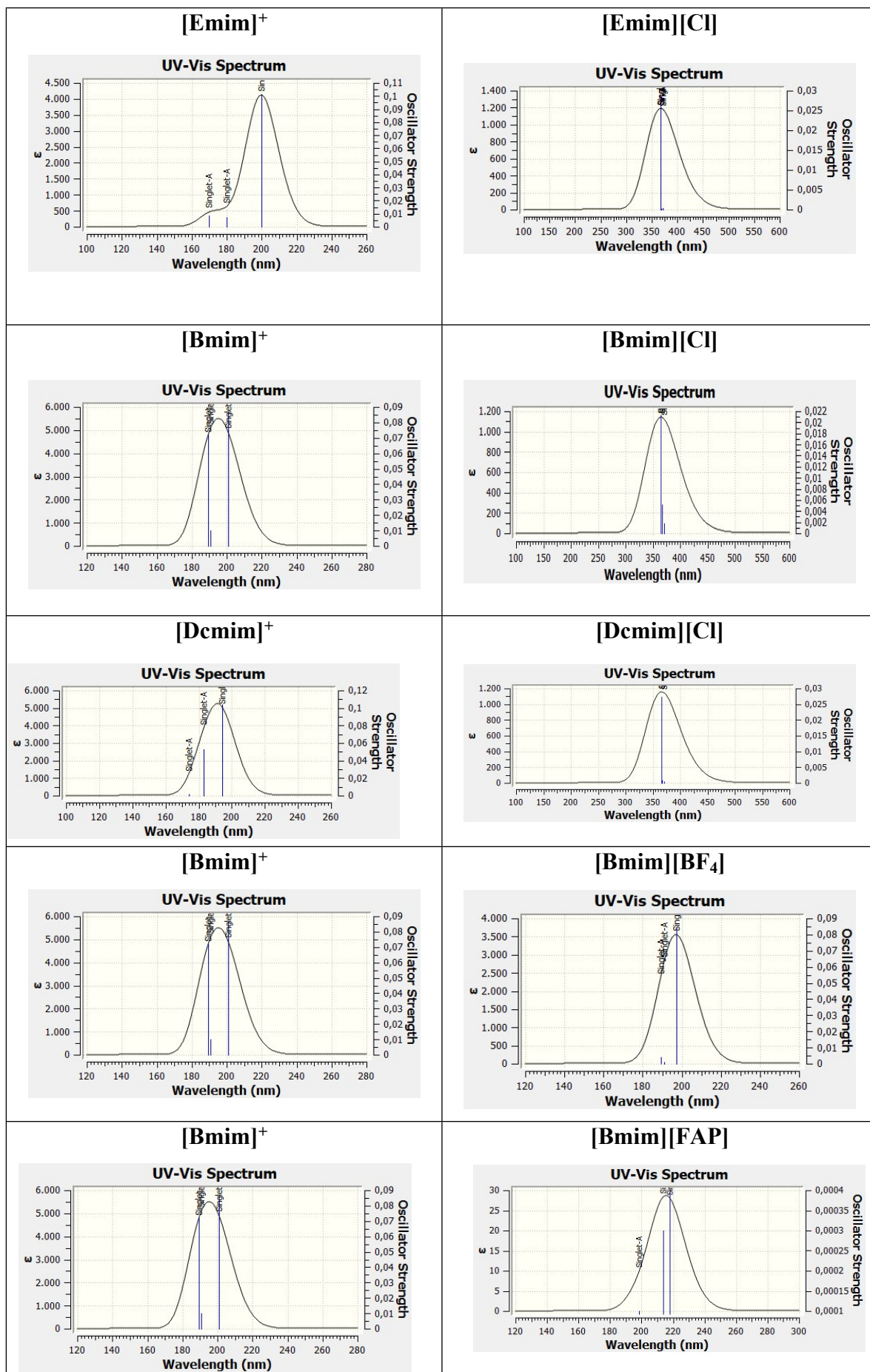


Figure S3. Calculated UV-Visible spectra at TD-B3LYP/6-311**G++ computational level



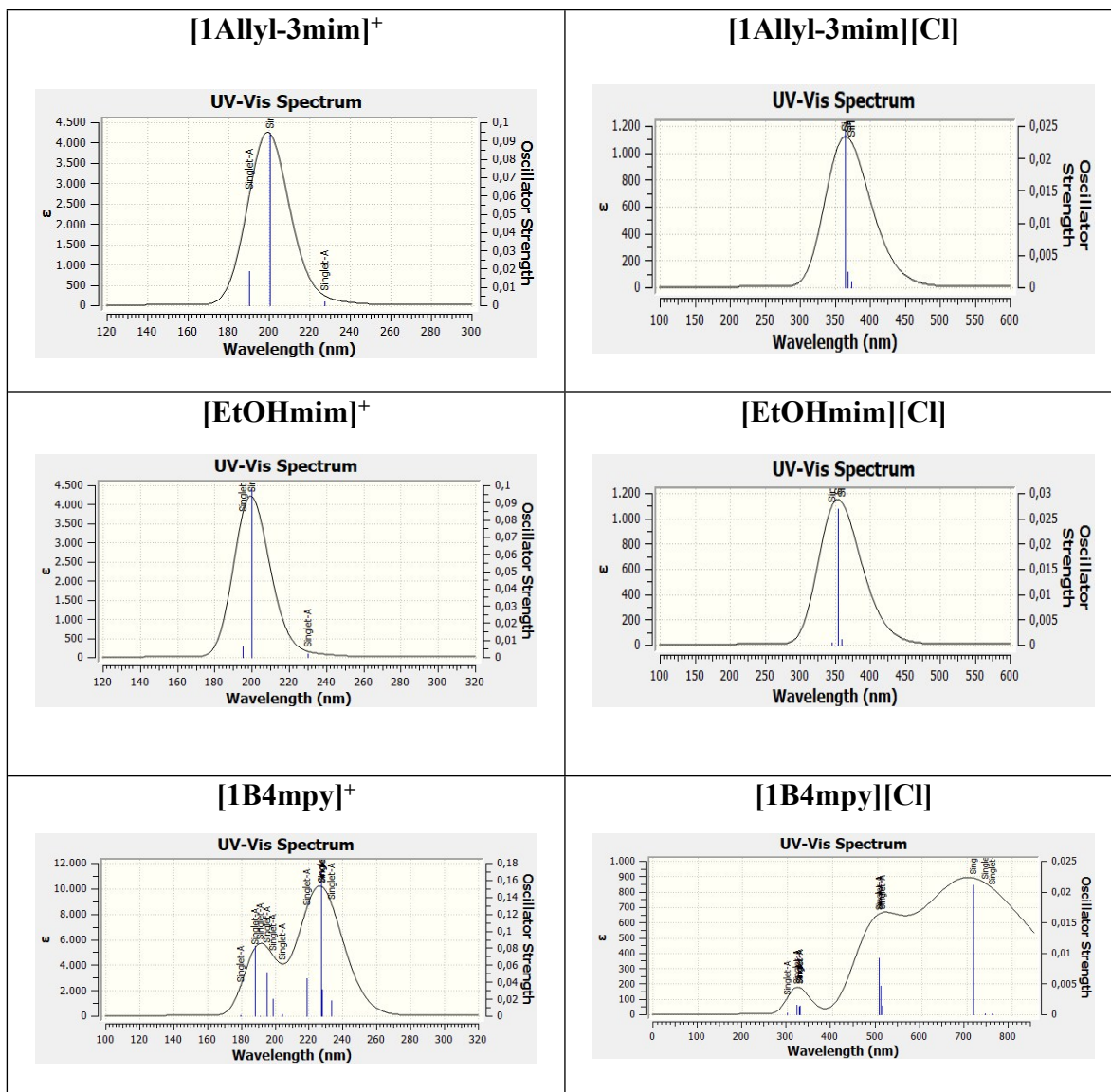


Figure S4. Calculated HOMO and LUMO molecular orbitals of [Bmim] cation at TD-B3LYP/6-311**G++ computational level

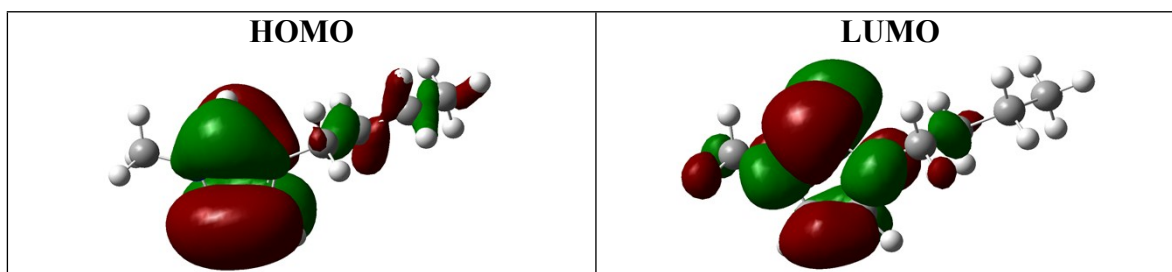


Figure S5. Electrostatic potential surface of [Bmim] cation and [Bmim][FAP] ionic pair in fundamental (S_0) and first excited (S_1) electronic state calculated at TD-B3LYP/6-311**G++ computational level

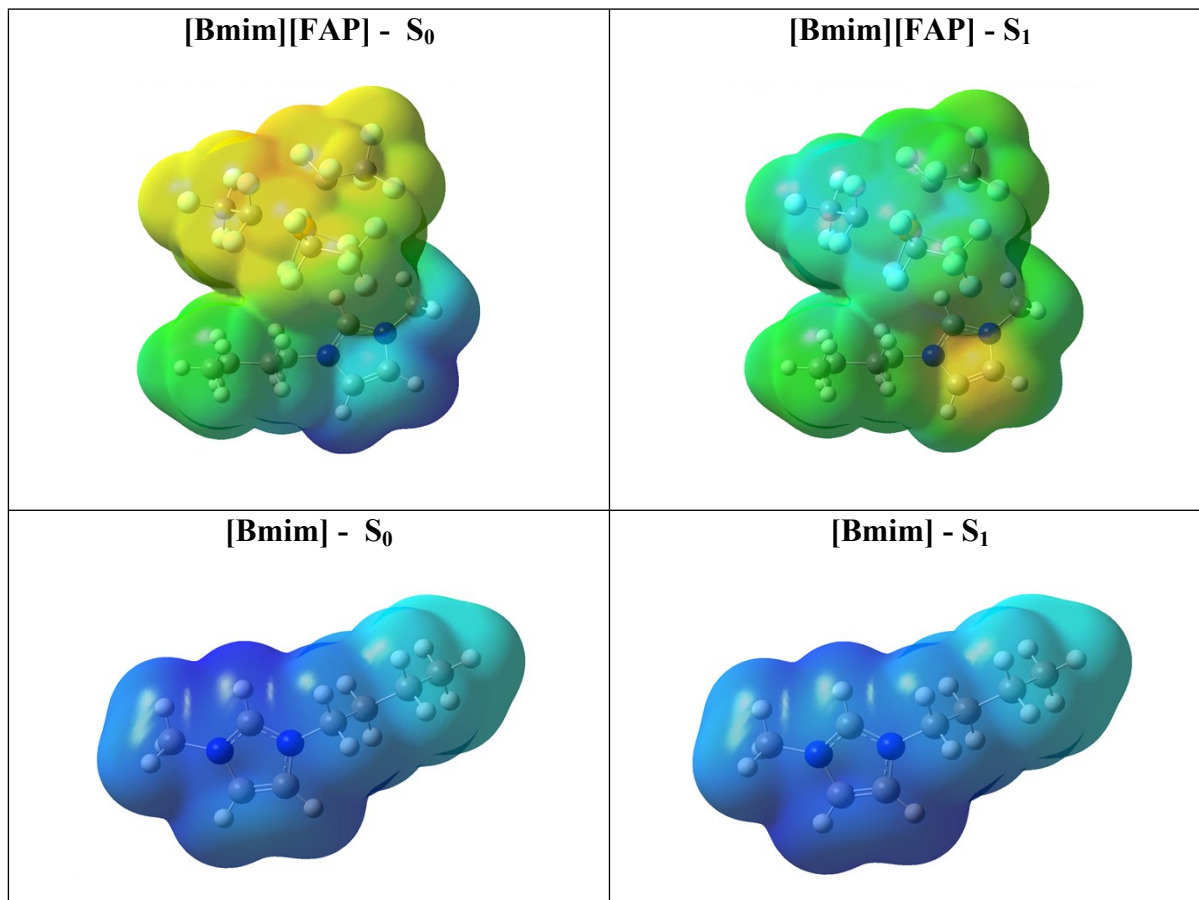


Figure S6. Percentage of IL adsorbed onto TiO₂ in dark tests.

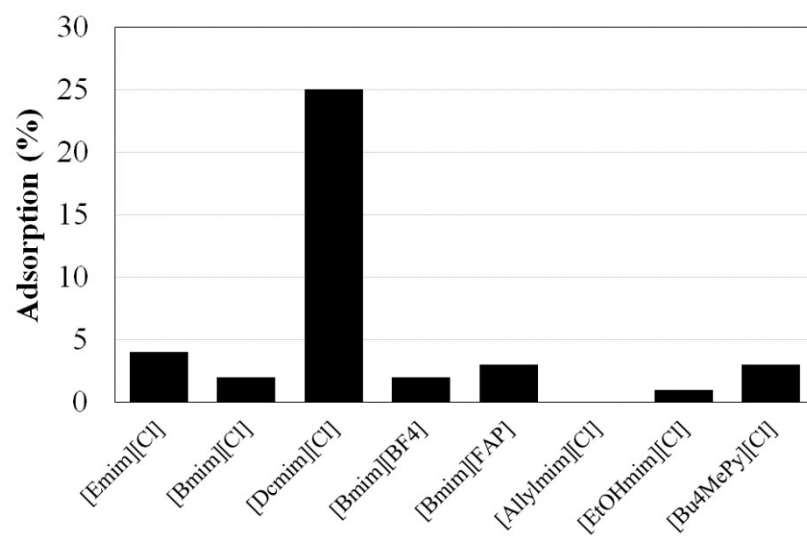


Figure S7. Evolution of the TOC and the carbon amount measured from IL, organic acids and non-identified byproducts upon irradiation time: a) [Bmim][Cl] and b) [Bu₄MePy][Cl].

