

Electronic Supplementary Information

The stability of TFAA adsorbed on the surface of Ti-TFAA powder was checked by FT-IR spectra were recorded before and after three cycles of toluene photodegradation (Fig. 1). As can be observed in Fig. 1 the only bands that can be identified after the photodegradation cycles are a broad band between 3660 and 3000 cm^{-1} and a band at 1640 cm^{-1} , which correspond to water adsorbed on the catalyst surface and hydroxyl groups entwined in the catalyst surface. On the other hand, the bands corresponding to the TFAA molecules have disappeared after three cycles which indicates that TFAA is oxidized and gradually decomposes during the photodegradation tests under UV radiation, probably leaving F ions adsorbed on the surface that prevent the decay of the photocatalytic performance by the lost of the $-\text{CF}_3$ groups.

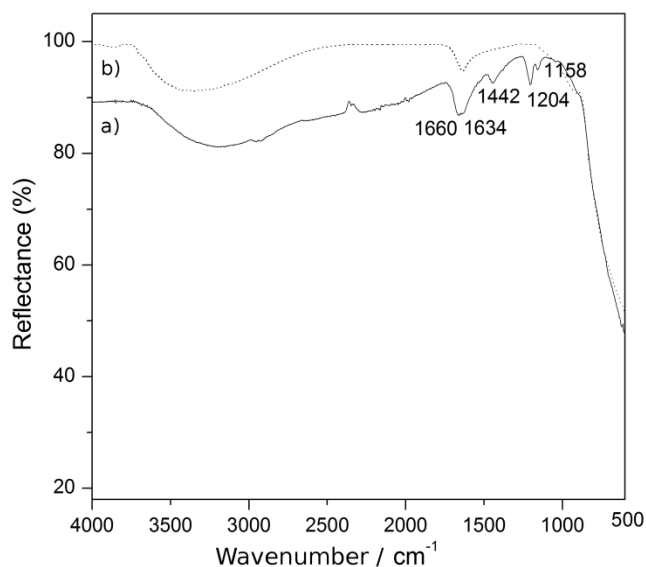


Fig 1. FT-IR spectra of Ti-TFAA powder: a) before and b) after three toluene photodegradation cycles.

The samples were analyzed with a Nicolet IS10 spectrometer.