Supplementary information

Efficient degradation of Orange G dye using Quartz-Sand@Polythiophene composite for Peroxymonosulfate Activation: A sustainable approach for advanced oxidation processes

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Text S1: Chemical reagent

The quartz sand used in this work was sourced from the southern of Morocco (Assa region). The QS was collected, crushed, and sieved to a particle size of 70µm. Subsequently, it underwent a cleaning process with distilled water and was then dried at a temperature of 60°C.

Thiophene (C_4H_4S, 99%), Chloroform ($CHCl_3$), anhydrous iron chloride ($FeCl_3$), Acetone (C_3H_6O), Sodium hydroxide (NaOH, 98%), Hydrochloric acid (HCl, 35%), Orange G, Tert-butanol ($(CH_3)_3COH$, 99.5%), Ethanol (C_2H_5OH, 99.8%), P-benzoquinone ($C_6H_4(=O)_2$, 98%), L-Histidine ($C_6H_9N_3O_2$,99%) were obtained from Sigma Aldrich (St. Louis, MO, USA).

Text S2: Characterization

Surface chemistry of QS, and QS@Ch-Glu before and after adsorption was carried out by Fourier-transform infrared spectra (FTIR) using a Shimadzu spectrometer equipped with a Jasco ATR PRO ONE module, the spectra were scanned at resolution of 16 cm-1. Structural characterization of QS, and QS@Ch-Glu was carried out by X-ray diffraction (XRD) (Bruker D8 Advance Twin, λ(KαCu) =1.5418 Å radiation, at voltage of 40 kV and current of 40 mA). Surface morphology and elemental content of QS, and QS@Ch-Glu before and after adsorption were observed using scanning electron microscopy (SEM) coupled with energy dispersive X-ray spectrometry (EDS) analysis (SEM,

JEOL, JSM-IT200). Radicals generated during the PMS activation process were detected on an electron paramagnetic resonance (EPR) spectrometer (EMX-plus X-band spectrometer (Bruker)).

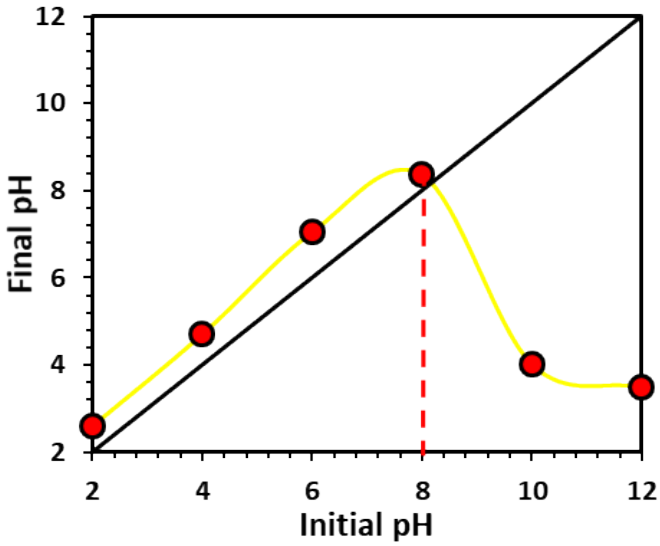

Fig. S1: The pHpzc of QS@PTh.

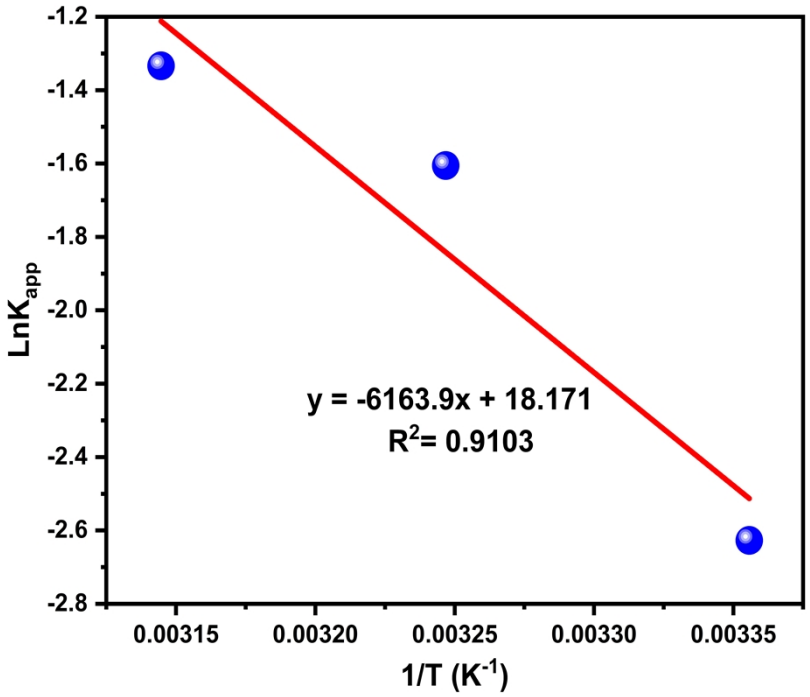

Fig. S2: Arrhenius plot for the OG dégradation using QS@PTh as acatalyst for PMS activation.