Solar light active Mesoporous Cr-TiO2 for photo-degradation of Spent wash: An in-depth study of degradation reaction using LC-MS QTOF Technique.


aCentre or Materials for Electronic Technology, Government of India, Panchavati, Off Pashan Road, Pune 411008, India.

b Department of Biotechnology, Shivaji University, Kolhapur, 416004, India.

c Annsaheb Magar Mahavidyalaya, Hadapsar, Pune 411028, India.

Corresponding Author: sonawaner@yahoo.com, sonawane@cmet.gov.in

Electronic Supplementary Information (ESI)
Fig. S1. Thermo-gravimetric analysis of 5% Cr-TiO₂ powdered gel sample.

Fig. S2 (A) XRD pattern of (a) Undoped TiO₂ (b) 0.5% Cr-TiO₂ (c) 1% Cr-TiO₂ (d) 2% Cr-TiO₂, (e) 3% Cr-TiO₂, (f) 4% Cr-TiO₂ and (g) 5% Cr-TiO₂ samples obtained by Calcination at 400°C. and (B) Enlarged version XRD pattern of (110) plane (a) Undoped TiO₂ and (b) 5% Cr-TiO₂.
Fig. S3. Nitrogen sorption isotherm of (a) Cr-TiO$_2$ at 500$^\circ$C and (b) Cr-TiO$_2$ at 600$^\circ$C. In inset BJH pore size distribution curve of (a) 5% Cr-TiO$_2$ at 500$^\circ$C and (b) 600$^\circ$C of 5% Cr-TiO$_2$ catalyst.
Fig. S4. t plot of mesoporous catalyst (a) Undoped TiO$_2$. (b) 5% Cr-TiO$_2$.

Fig. S5. FT-IR spectra of (a) Undoped TiO$_2$ (b) 0.5% Cr-TiO$_2$ (c) 1% Cr-TiO$_2$ (d) 2% Cr-TiO$_2$, (e) 3% Cr-TiO$_2$, (f) 4% Cr-TiO$_2$ and (g) 5% Cr-TiO$_2$ samples.

Fig. S6. UV Visible spectra of spentwash solution after irradiation with sunlight (A) for 5% Cr- TiO$_2$ catalyst and (B) for P-25 Degussa Catalyst for (a) 0 hr, (b) 1 hr, (c) 2 hr, (d) 2.30 hr, (e) 3 hr, (f) 4 hr and (g) 5 hr.
Fig. S7. Degradation of spent wash using 5% Cr-TiO$_2$ catalyst calcined at different temperature.
Fig.S8 Negative ESI TIC fragmentation spectra of spentwash after irradiation with sunlight (a) Undoped TiO$_2$, (b) 5% Cr- TiO$_2$. 
Fig. S9. Positive ESI TIC fragmentation spectra of spentwash after irradiation with sunlight (a) Undoped TiO$_2$, (b) 5% Cr-TiO$_2$. 
Fig. S10 Reduction of TOC during photocatalytic trial on spentwash for (a) Undoped TiO$_2$, (b) Degussa P-25, (c) 5% Cr-TiO$_2$ catalyst.
Fig. S11. XRD pattern of (a) 5% Cr-TiO$_2$ calcined at 400$^\circ$C and (b) 5% Cr-TiO$_2$ recovered after 3$^{rd}$ cycles of photo-degradation of spentwash solution under sunlight.

Fig. S12. Degradation of spent wash using 5% Cr-TiO$_2$ catalyst under natural sunlight for 3 consecutive cycles.
Fig. S13 Recovery of 5% Cr-TiO$_2$ catalyst with respect to number of cycle.