Supplemental Materials

Enhanced Visible-Light Photocatalysis of Nanocomposites of Copper Oxide and Single-Walled Carbon Nanotubes for the Degradation of Methylene Blue

Kamal Prasad Sapkota[1,2], Insup Lee[1], Md. Abu Hanif[1], Md. Akherul Islam[1], Jeasmin Akter[1], and Jae Ryang Hahn[1,3,*]

[1]Department of Chemistry and Bioactive Material Sciences, Research Institute of Physics and Chemistry, Jeonbuk National University, Jeonju 54896, Korea; mychemistry2037@gmail.com (K.P.S.); insup@jbnu.ac.kr (I.L.); hanif4572@gmail.com (M.A.H.); akherulraju@gmail.com (M.A.I.); tina44445@gmail.com (J.A.)
[2]Department of Chemistry, Amrit Campus, Tribhuvan University, Kathmandu 44618, Nepal
[3]Textile Engineering, Chemistry and Science, North Carolina State University, 2401 Research Dr., Raleigh, NC 27695-8301, USA
*Correspondence: jrhahn@jbnu.ac.kr

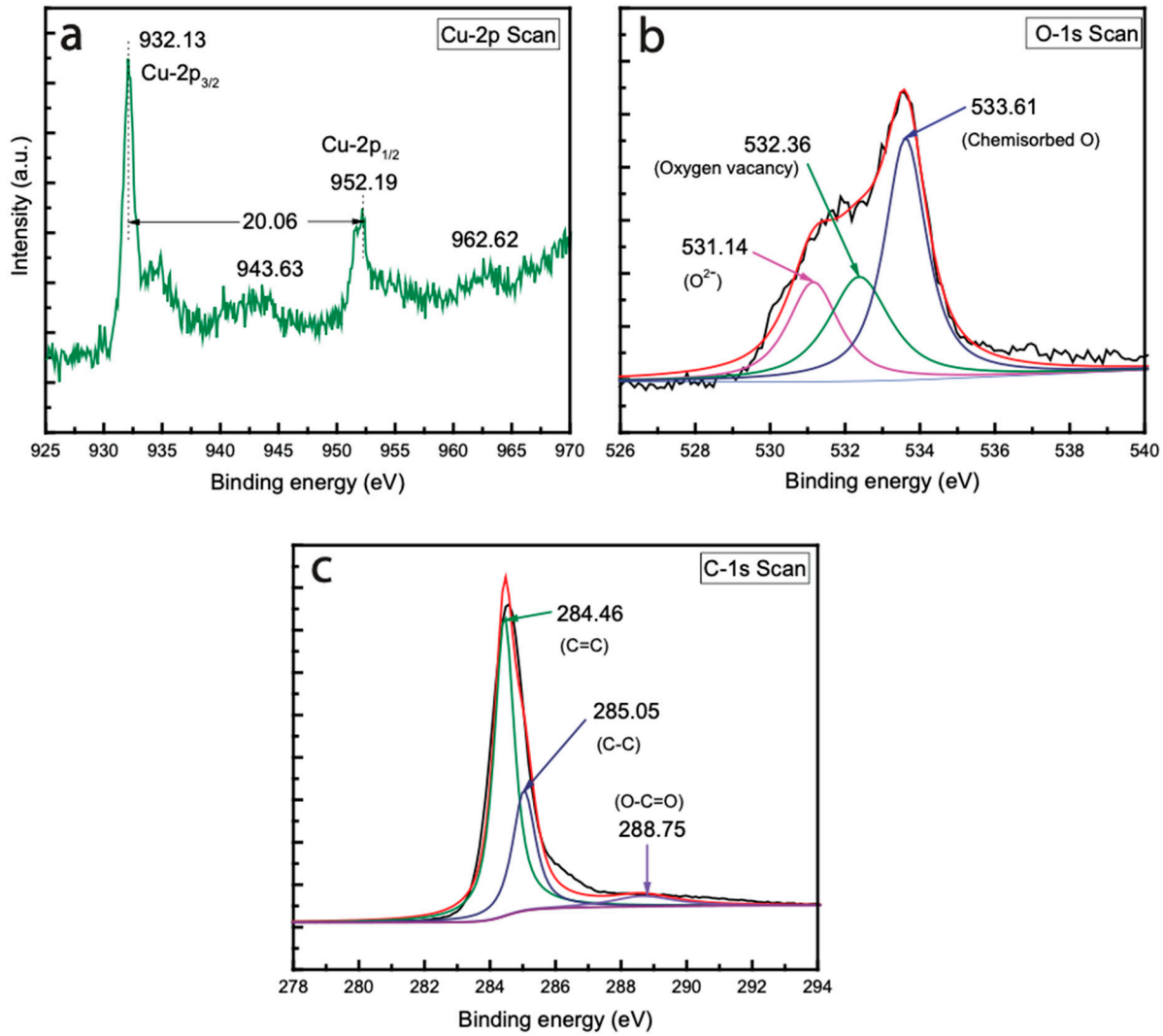

Figure S1. High resolution XPS spectra: (a) Cu-2p3/2 and Cu-2p1/2 peaks, (b) O-1s core level and (c) C-1s core level of CuO-SWCNT-0.5 nanocomposite.

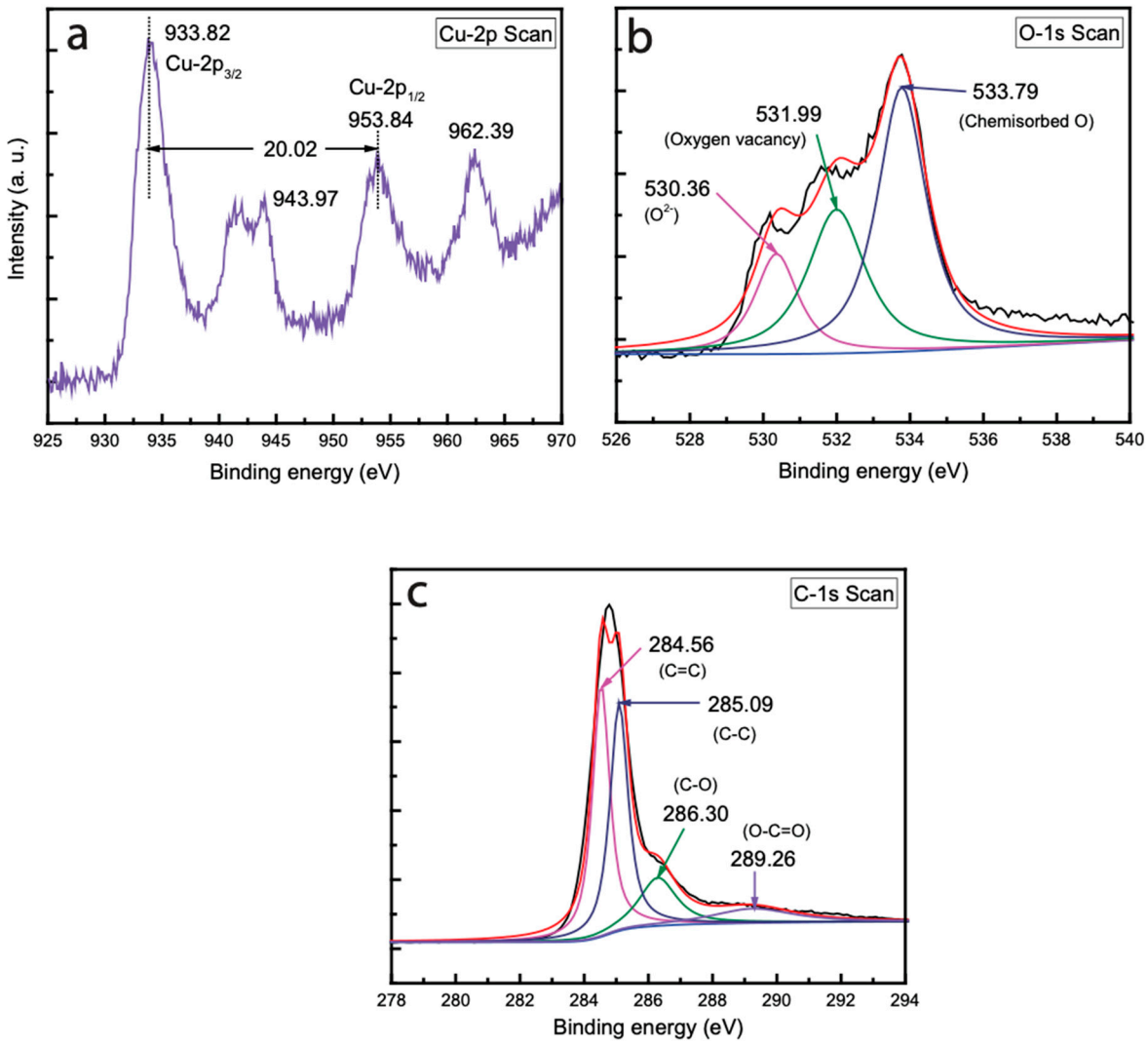

Figure S2. High resolution XPS spectra: (a) Cu-2p3/2 and Cu-2p1/2 peaks, (b) O-1s core level and (c) C-1s core level of CuO-SWCNT-2 nanocomposite.

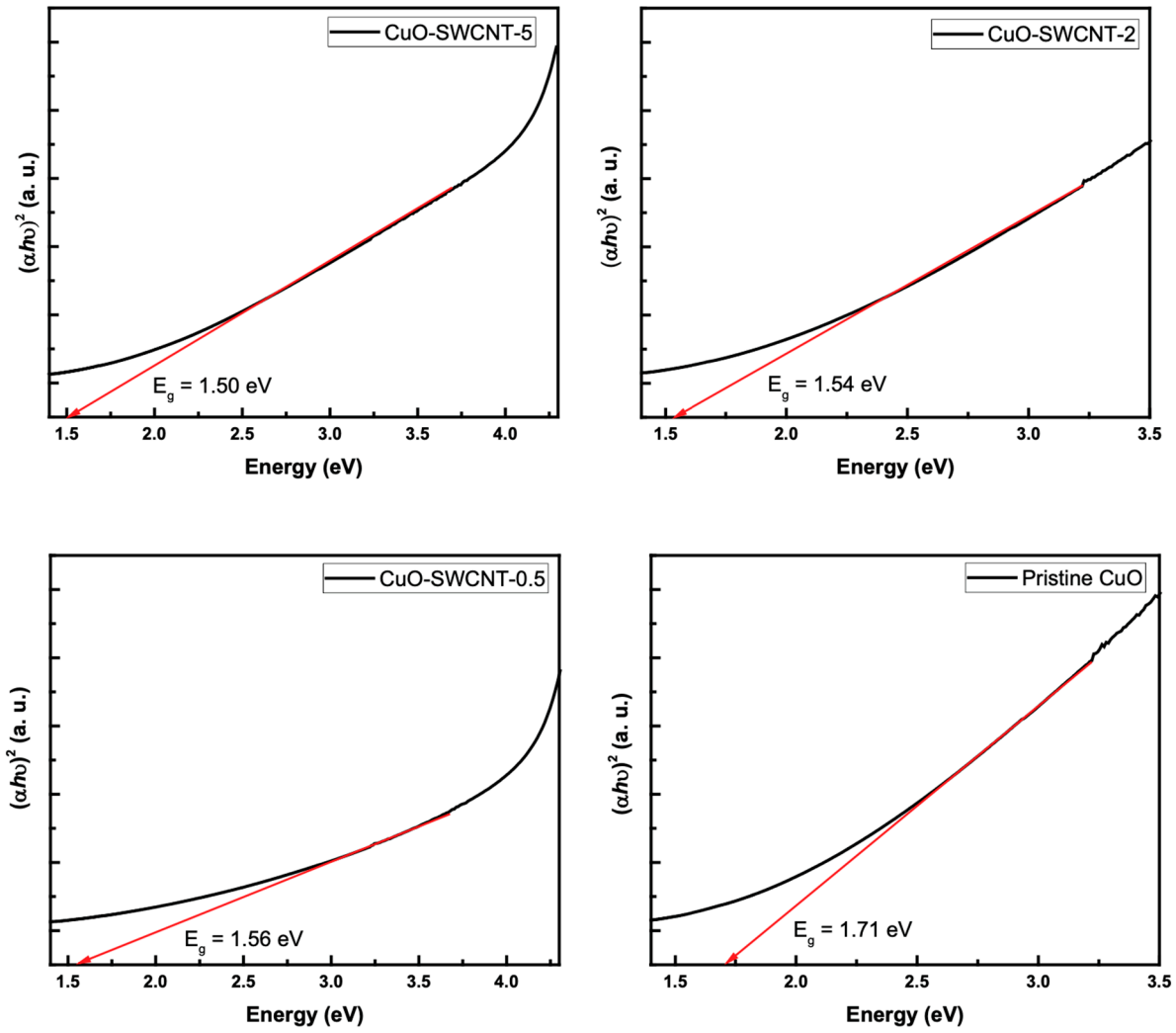

Figure S3. Tauc plots depicting the reduction in the bandgap of CuO due to the formation of its heterojunction with SWCNTs.

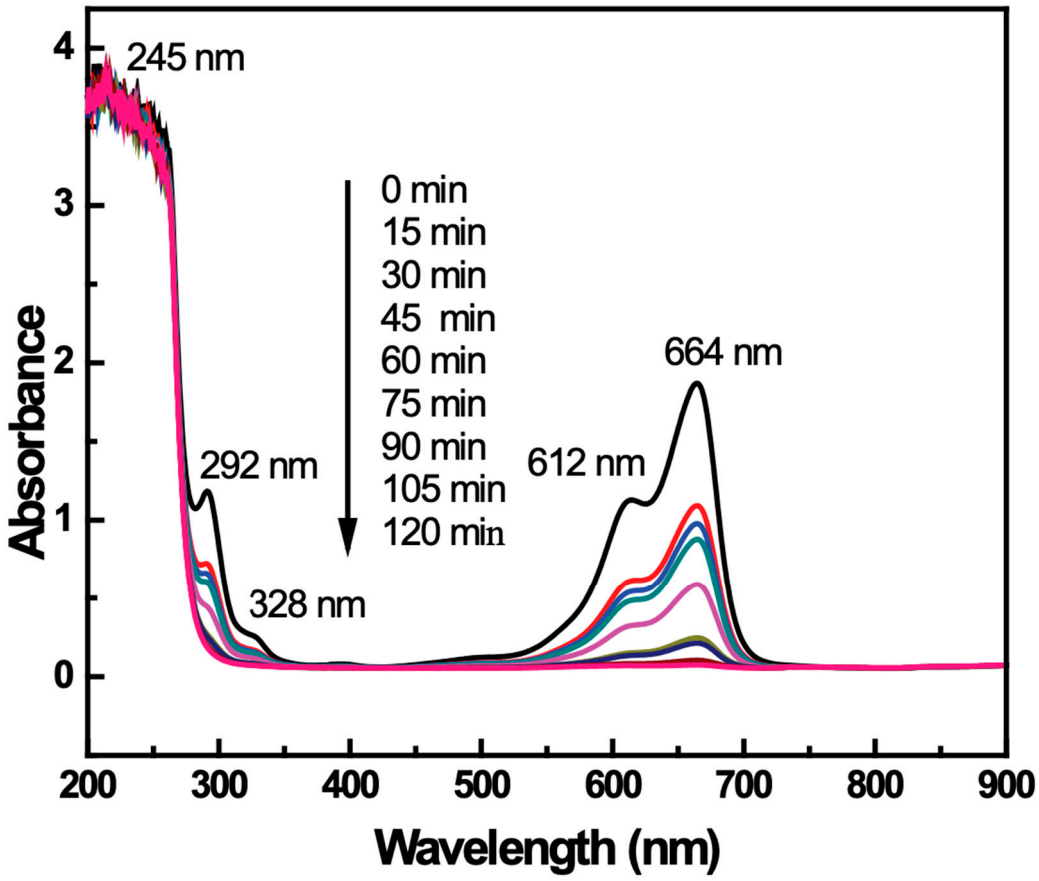

Figure S4. UV-vis absorbance spectra of photodegradation of MB by the action of CuO-SWCNT-5 photocatalyst (in the full absorption range of 200-900 nm)

The UV-vis spectra of the reaction solution display characteristic absorption bands at different regions. The characteristics absorption peaks that appear at 664 and 612 nm in the visible range (Fig S4) are ascribed to chromophore functional groups of monomers and dimers of MB. The other peaks at 292 and 245 nm in the ultraviolet region are attributed to $\pi \rightarrow \pi^*$ transitions originated from unsaturated conjugate aromatic rings of MB [1].

References

1. Wu, Z.; Zhu, W.; Zhang, M.; Lin, Y.; Xu, N.; Chen, F.; Wang, D.; Chen, Z. Adsorption and Synergetic Fenton-like Degradation of Methylene Blue by a Novel Mesoporous-Fe2O3/SiO2 at Neutral pH. Ind. Eng. Chem. Res. **2018**, 57, 5539–5549.

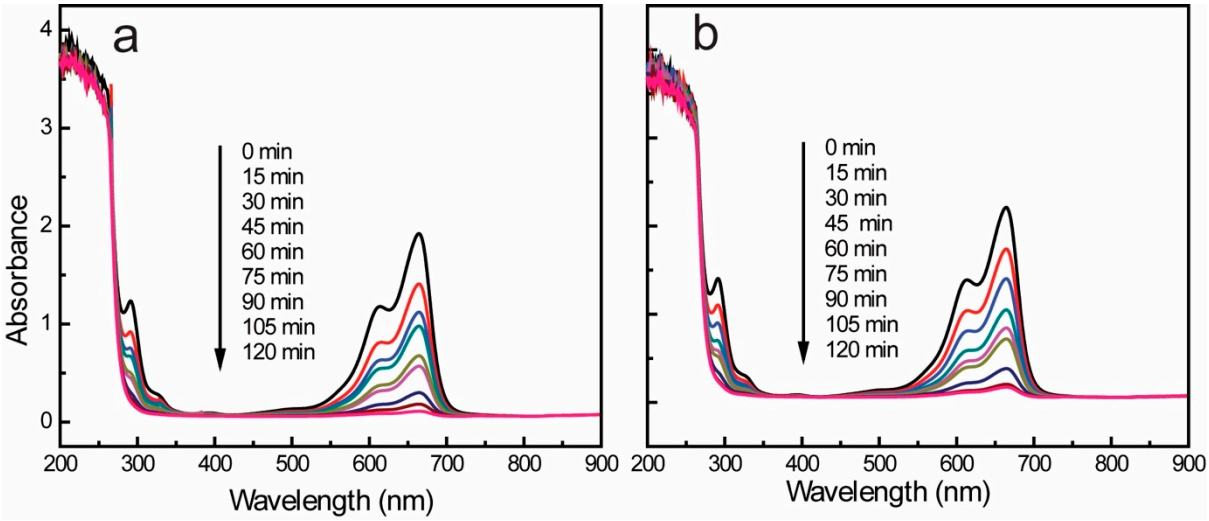

Figure S5. UV-vis absorbance spectra of photodegradation of MB by the action of photocatalysts; CuO-SWCNT-2 (a) and CuO-SWCNT-0.5 (b) (in the full absorption range of 200-900 nm)

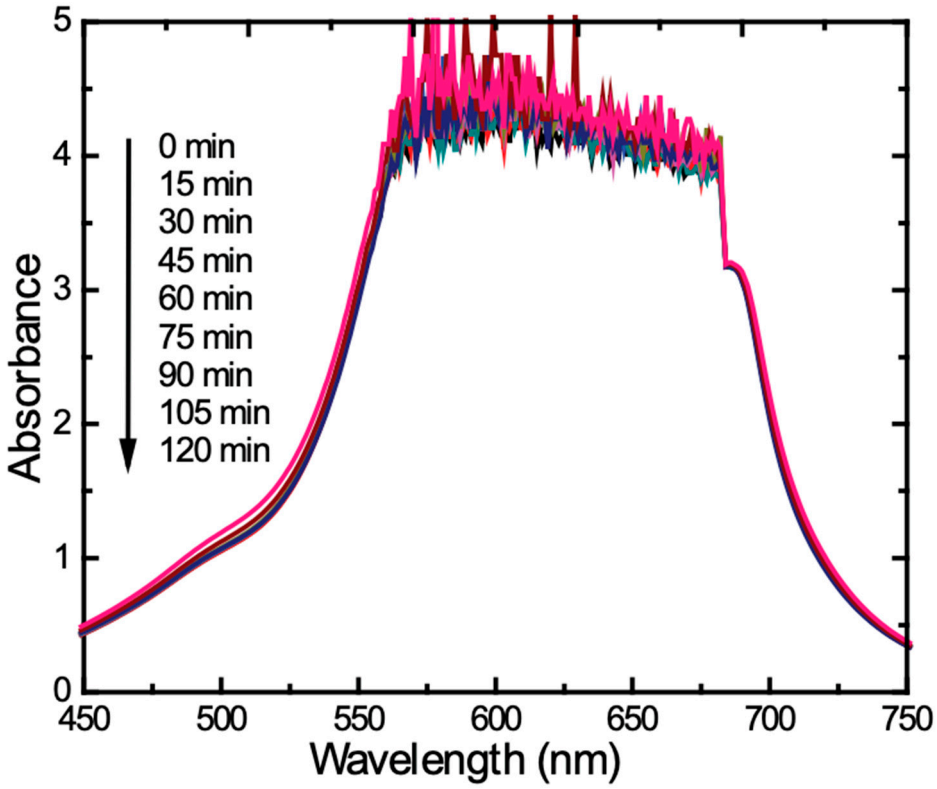

Figure S6. Blank test; effect of solar light alone on the decomposition of MB in the absence of catalyst