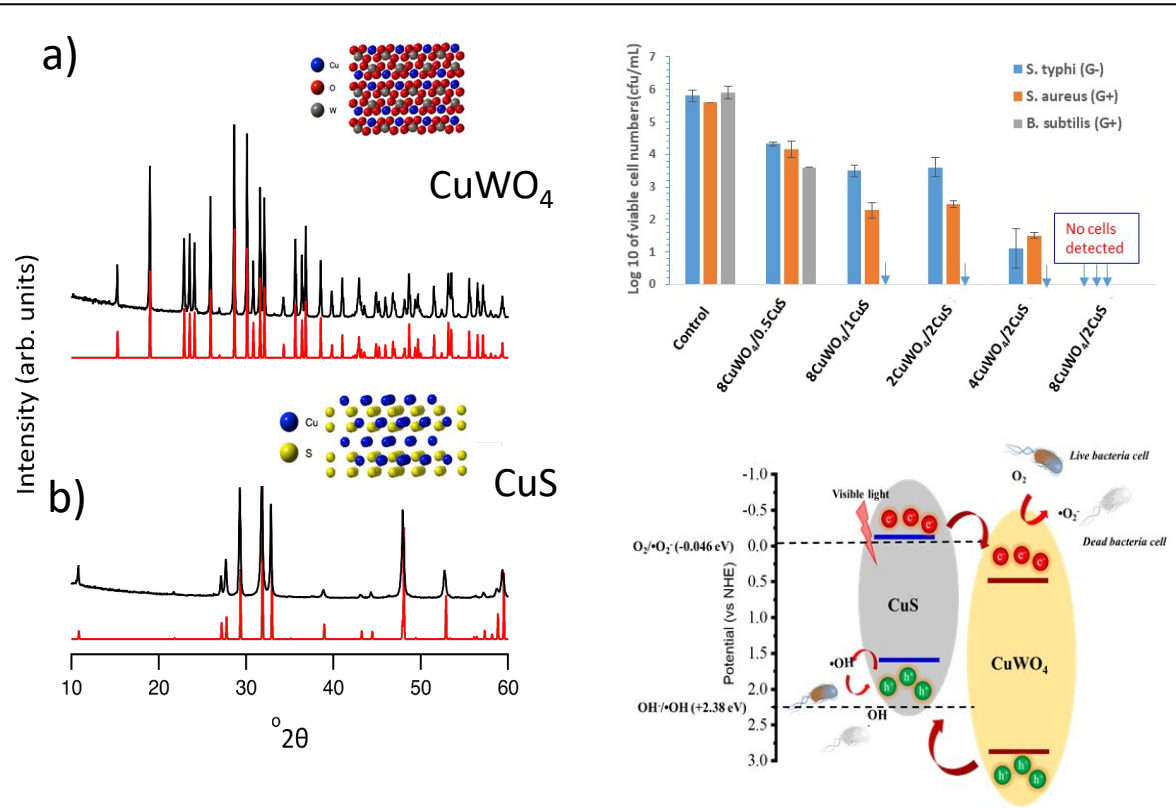
NCCU-PSU Partnership for Research and Education in Nanoscale Materials

Marvin Wu, North Carolina Central University

- Visible-light-driven semiconductors have potential for environmental remediation such as pathogen disinfection.
- A quantitative approach to identifying an optimal combination for maximum antimicrobial efficacy has not been reported previously.
- $CuWO_4$/CuS hybrid composites were prepared by mixing $CuWO_4$ and CuS nanocrystals with varying ratios in phosphate buffered saline solution by ultrasound.
- The combination of 8 μg/mL $CuWO_4$ and 2 μg/mL CuS was found to be most efficient in generating an optimal synergistic effect for complete killing of all tested bacteria, offering a way to search for effective semiconductor combinations for pathogen disinfection.



XRD patterns of a) $CuWO_4$, and b) CuS. c) Antimicrobial effects of $CuWO_4$/CuS combination, and d) *Proposed mechanism of photocatalytic inactivation of bacteria by $CuWO_4$/CuS hybrid composite.*

X. Dong, R. R. Katzbaer, B. Chitara, L. Han, L. Yang, R. E. Schaak, F. Yan. *Environ. Sci. Nano*. 2022, 9, 4283 – 4294.

DMR-2122044

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The NCCU-PSU PREM for Hybrid Nanoscale Materials is broadening participation in materials science-related careers. During year 2, this PREM supported:

- 24 NCCU student researchers
- 21 student presentations at local at national scientific conferences
- 6 student co-authored publications

We would like to highlight the following students who were admitted to graduate STEM programs:

- Netanya Dennis (PhD Neuroscience, Yale University)
- Nia Martin and Dionne Mitchell (3 + 2 BS Chemistry (NCCU) / MS Packaging Science (Michigan State University)
- Ethan Hedrick (PhD Integrated Biosciences, North Carolina Central University)

NCCU student presenters at: (left) the Triangle Student Research Competition in Research Triangle Park, NC; and (right) the 2023 Materials Research Society Spring Meeting

NCCU PREM students Netanya Dennis (left), Dionne Mitchell (center) and Nia Martin (right)