

Electronic Supplementary Information

for the paper

Mechanochemical synthesis of non-stoichiometric copper sulfide $\text{Cu}_{1.8}\text{S}$ applicable as photocatalyst and antibacterial agent and synthesis scalability verification

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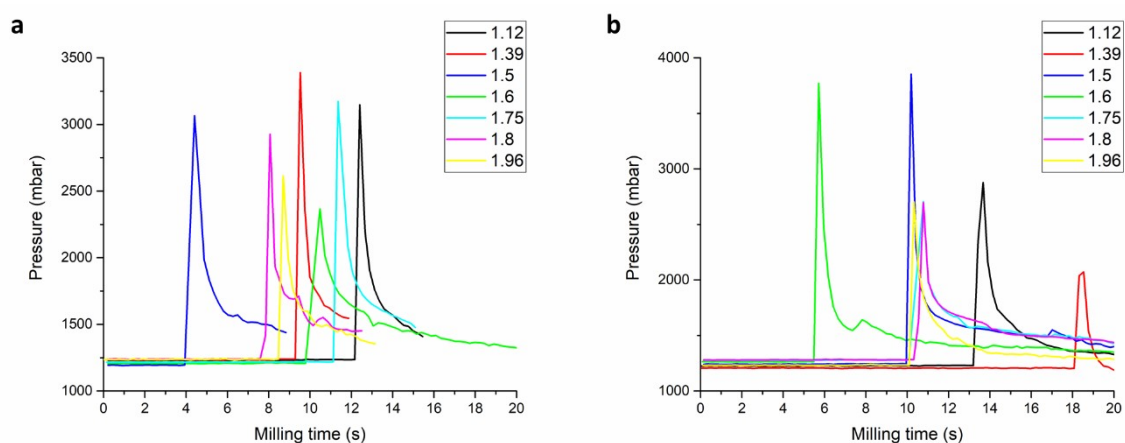


Fig. S1: Gas pressure changes for mixtures with different Cu:S ratios until 20 seconds of milling: (a) initial experiments, (b) repeated experiments.

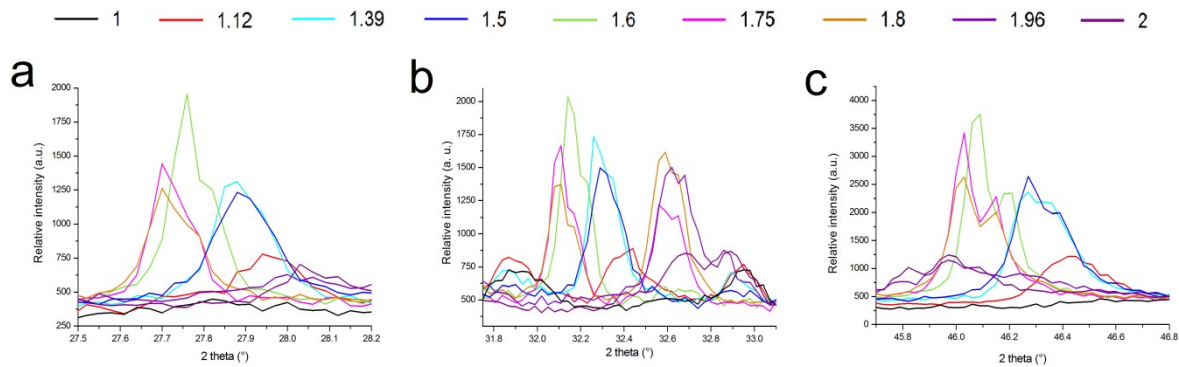


Fig. S2: Zoomed in regions of the XRD patterns of all the reaction mixtures taken directly after the pressure event. The Cu:S stoichiometric ratios are given in figure.

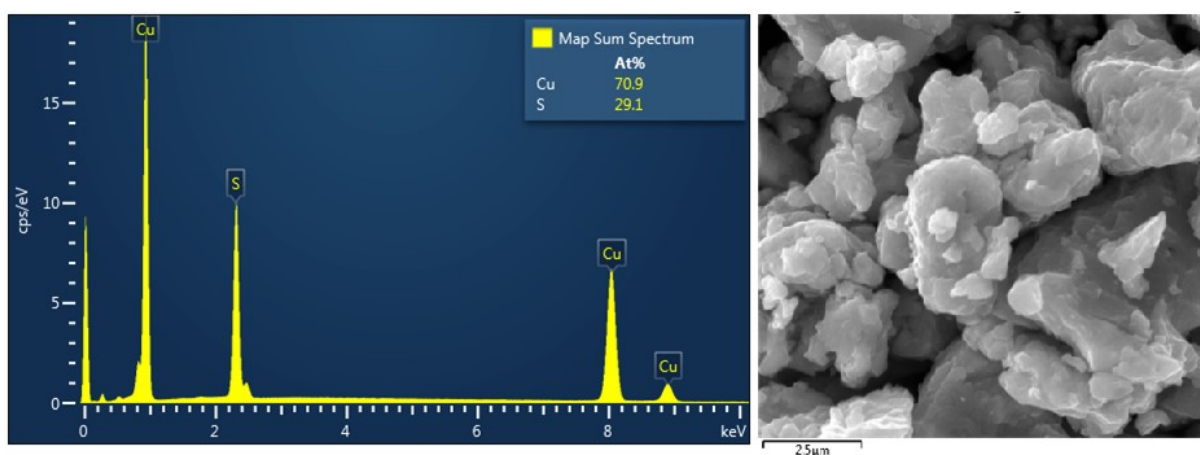


Fig. S3: EDS analysis of digenite Cu_{1.8}S product: the corresponding EDS spectrum (left) and the region from where the EDS spectrum was taken (right)

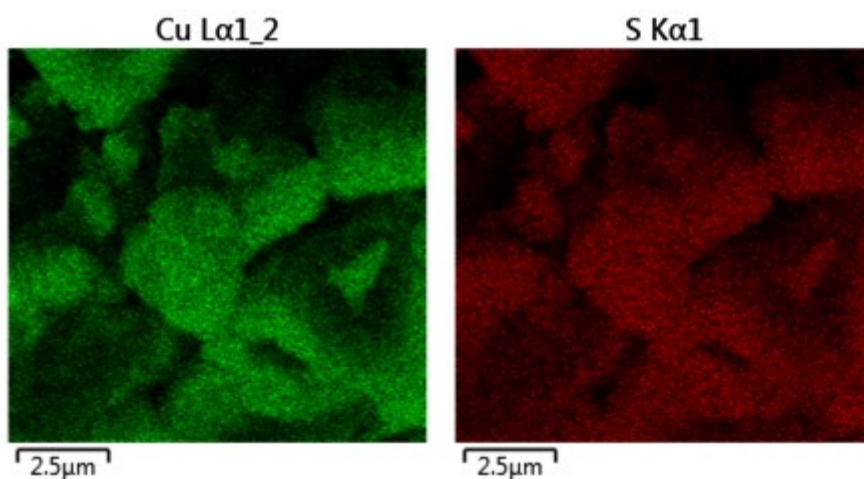


Fig. S4: SEM-EDS elemental mapping: Cu (left), S (right)

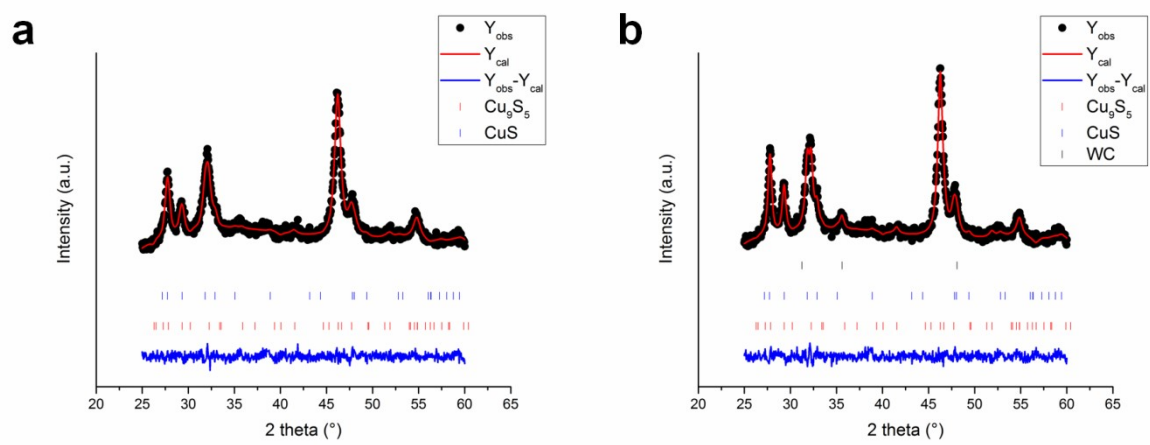


Fig. S5: Rietveld refinement results of XRD data of $\text{Cu}_{1.8}\text{S}$ prepared in: (a) laboratory scale, (b) scalable fashion using eccentric vibratory milling

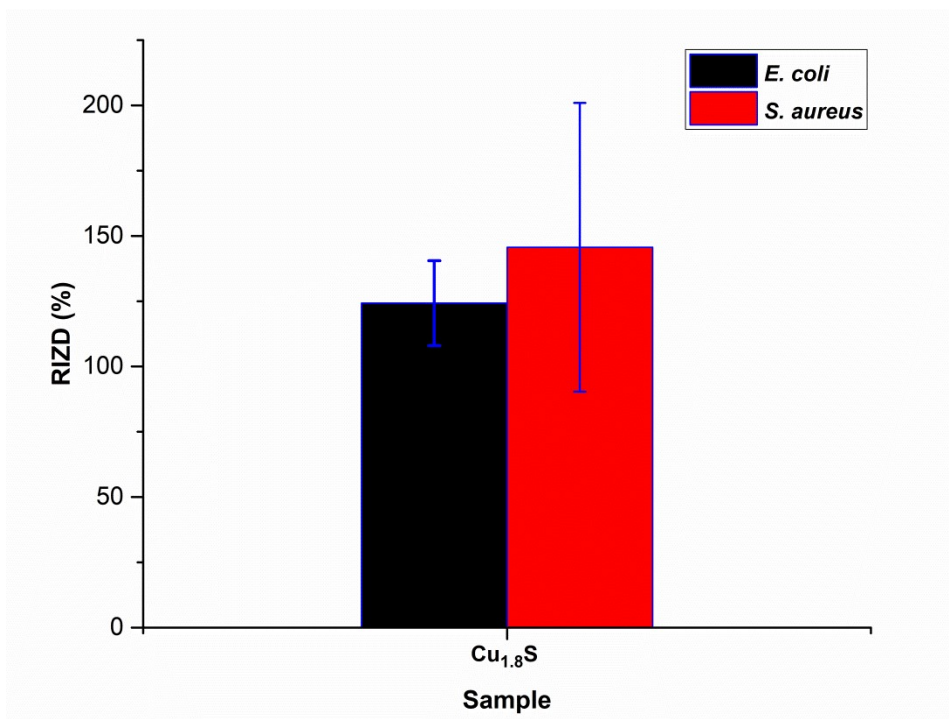


Fig. S6: Antibacterial activity of digenite $\text{Cu}_{1.8}\text{S}$ nanocrystals prepared using a lab-scale setup

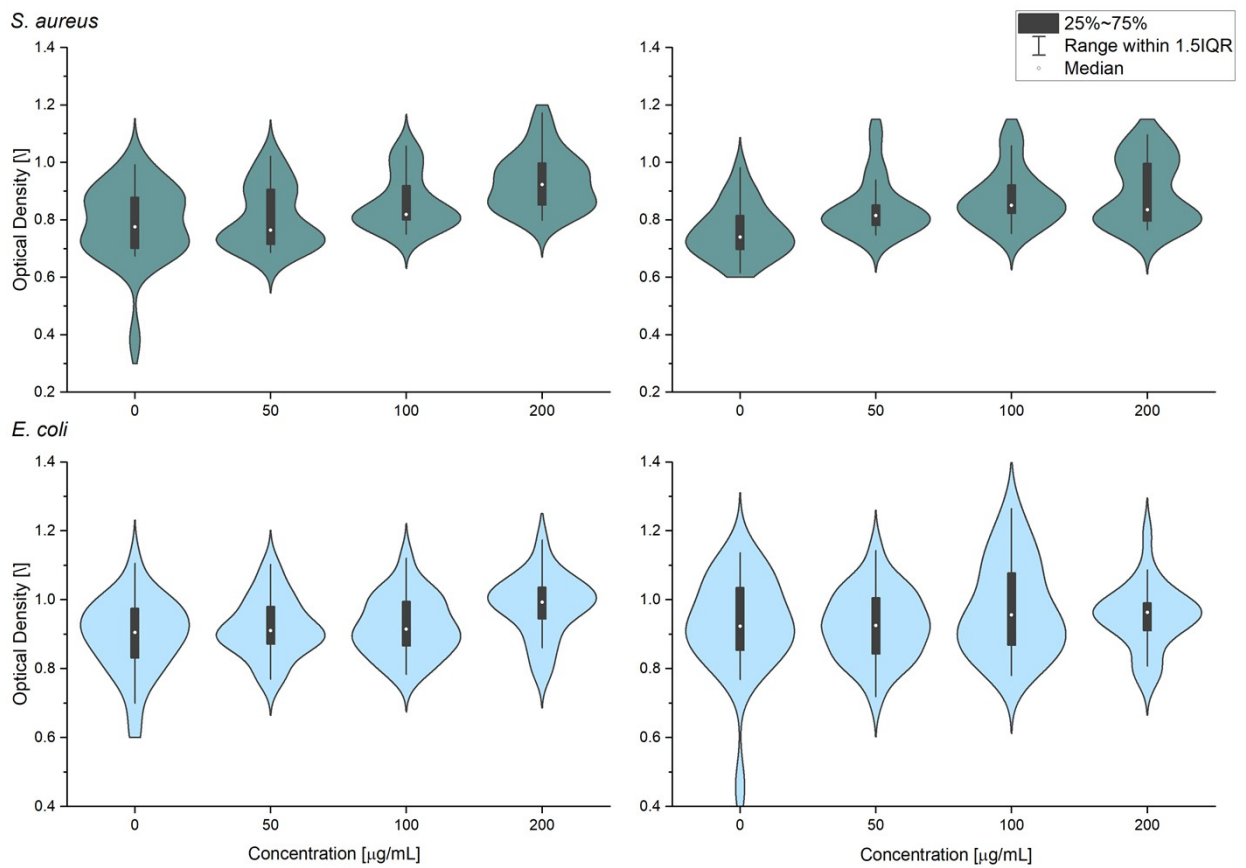


Fig. S7: Violin plots describing optical density after 24-hour incubation of cultures treated with Cu_{1.8}S nanoparticles . Top: *S. aureus*, bottom: *E. coli*, left: results for Cu_{1.8}S prepared on a laboratory scale, right: results for Cu_{1.8}S prepared in a scalable fashion

Optical density after 24-hours

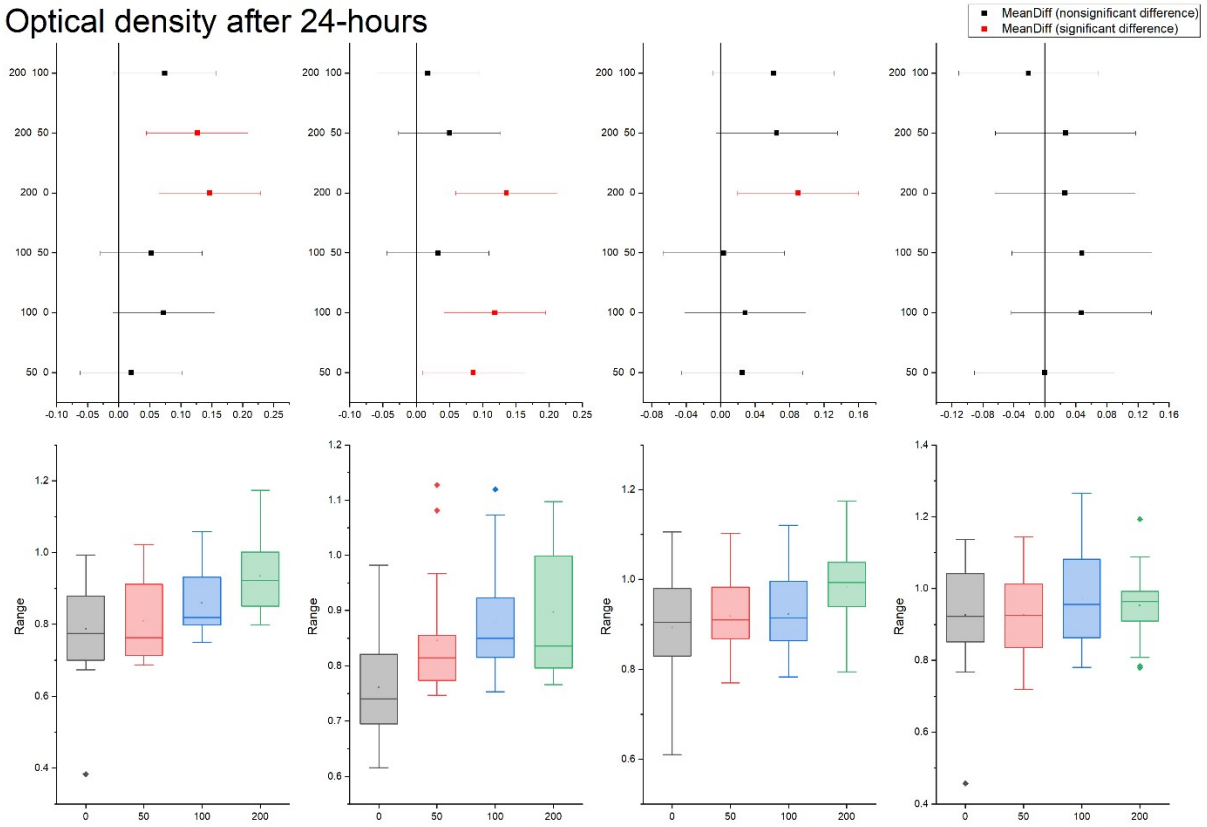


Fig. S8: Plots describing the statistical analysis of OD of bacterial cultures co-incubated with Cu_{1.8}S nanoparticles. The upper row represents the results of Tukey's posthoc analysis. The bottom row summarizes the obtained results on boxplots, where each plot corresponds to the plot above. Samples are presented in the following order, starting from the left: *S. aureus* Cu_{1.8}S_LAB, *S. aureus* Cu_{1.8}S_IND, *E. coli* Cu_{1.8}S_LAB, and *E. coli* Cu_{1.8}S_IND

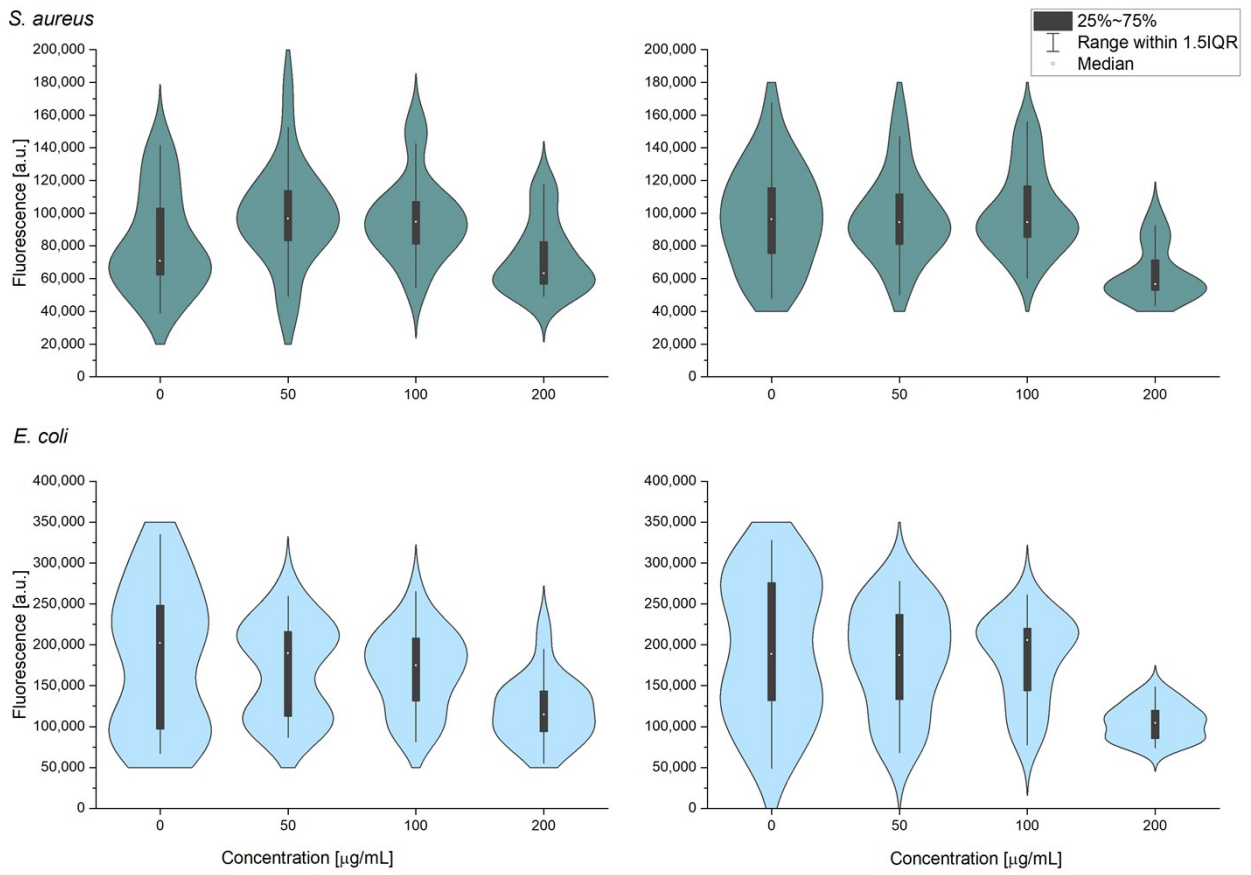


Fig. S9: Violin plots describing respiration after 24-hour incubation of cultures treated with Cu_{1.8}S nanoparticles . Top: *S. aureus*, bottom: *E. coli*, left: results for Cu_{1.8}S prepared on a laboratory scale, right: results for Cu_{1.8}S prepared in a scalable fashion

Respiration after 24 hours

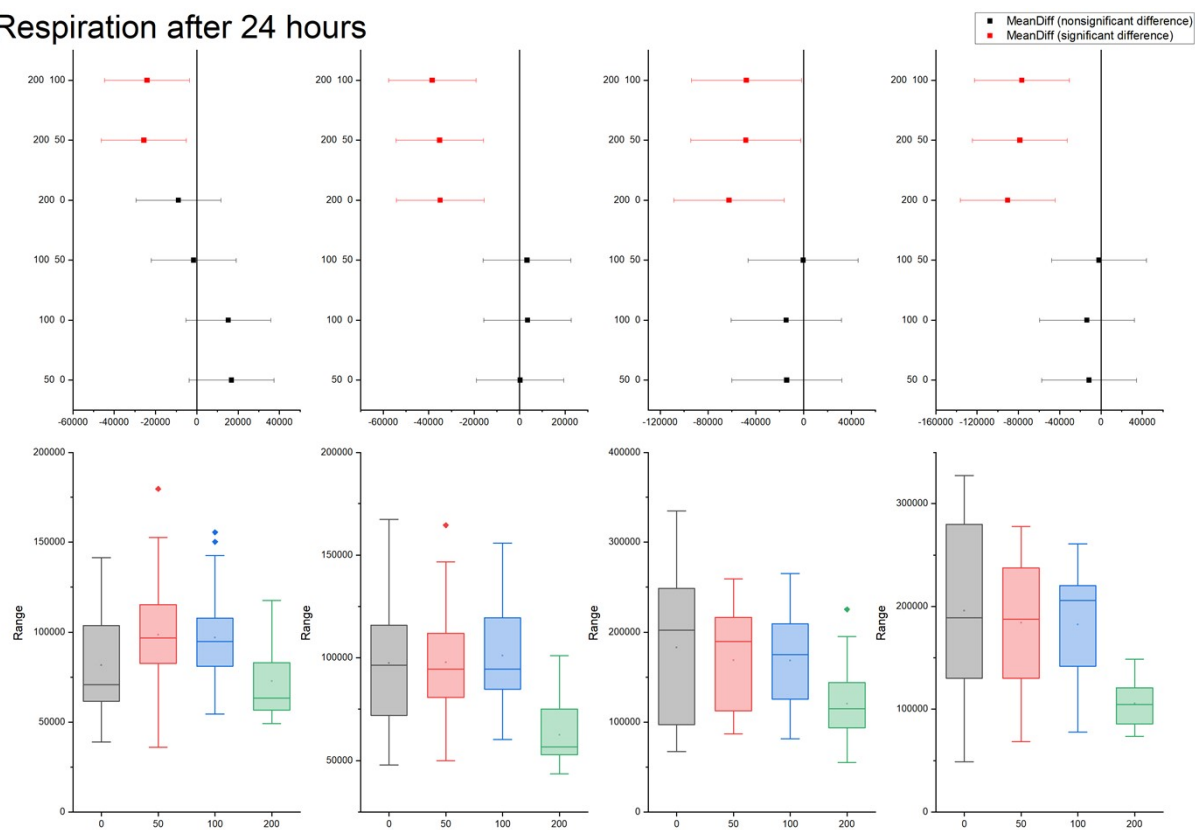


Fig. S10: Plots describing the statistical analysis of respiration (in resazurin assay) of bacterial cultures co-incubated with $\text{Cu}_{1.8}\text{S}$ nanoparticles. The upper row represents the results of Tukey's posthoc analysis. The bottom row summarizes the obtained results on boxplots, where each plot corresponds to the plot above. Samples are presented in the following order, starting from the left: *S. aureus* $\text{Cu}_{1.8}\text{S}$ _LAB, *S. aureus* $\text{Cu}_{1.8}\text{S}$ _IND, *E. coli* $\text{Cu}_{1.8}\text{S}$ _LAB, and *E. coli* $\text{Cu}_{1.8}\text{S}$ _IND