# Supporting Information (SI)

# Light-Powered Swarming Phoretic Antimony Chalcogenide-Based Microrobots with "On-the-Fly" Photodegradation Abilities

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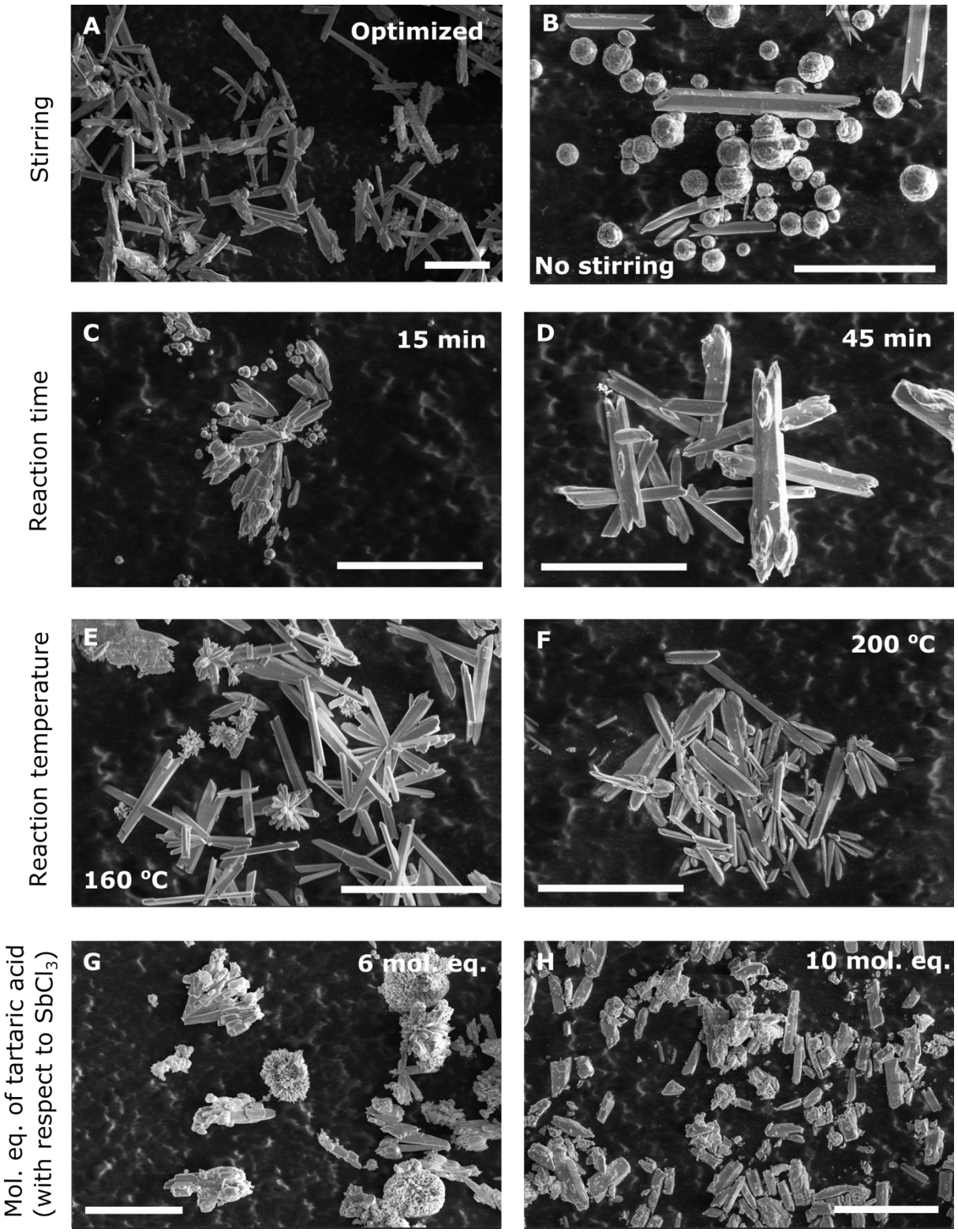


**Figure S1.** Optimization of the reaction conditions with respect to the morphology of the microrobots. Scale bar 20 um. The optimized procedure (A) was performed for 30 min at 180 °C with 8 mol. eq. of tartaric acid with respect to $SbCl_3$ added while being magnetically stirred.

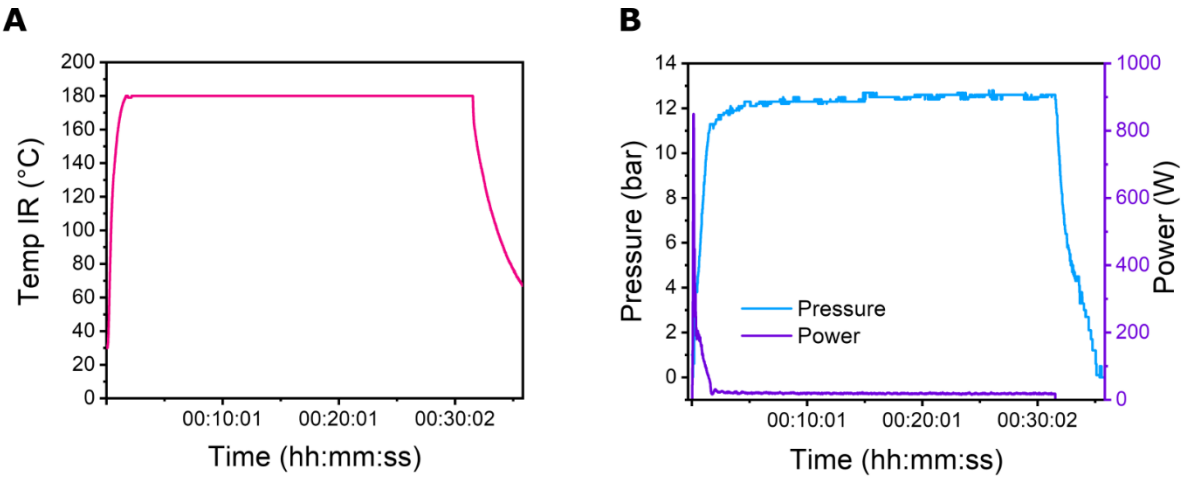


**Figure S2.** Detailed parameters during the microwave-assisted synthesis. A protocol of an optimized procedure showing (A) temperature and (B) pressure and power profiles.

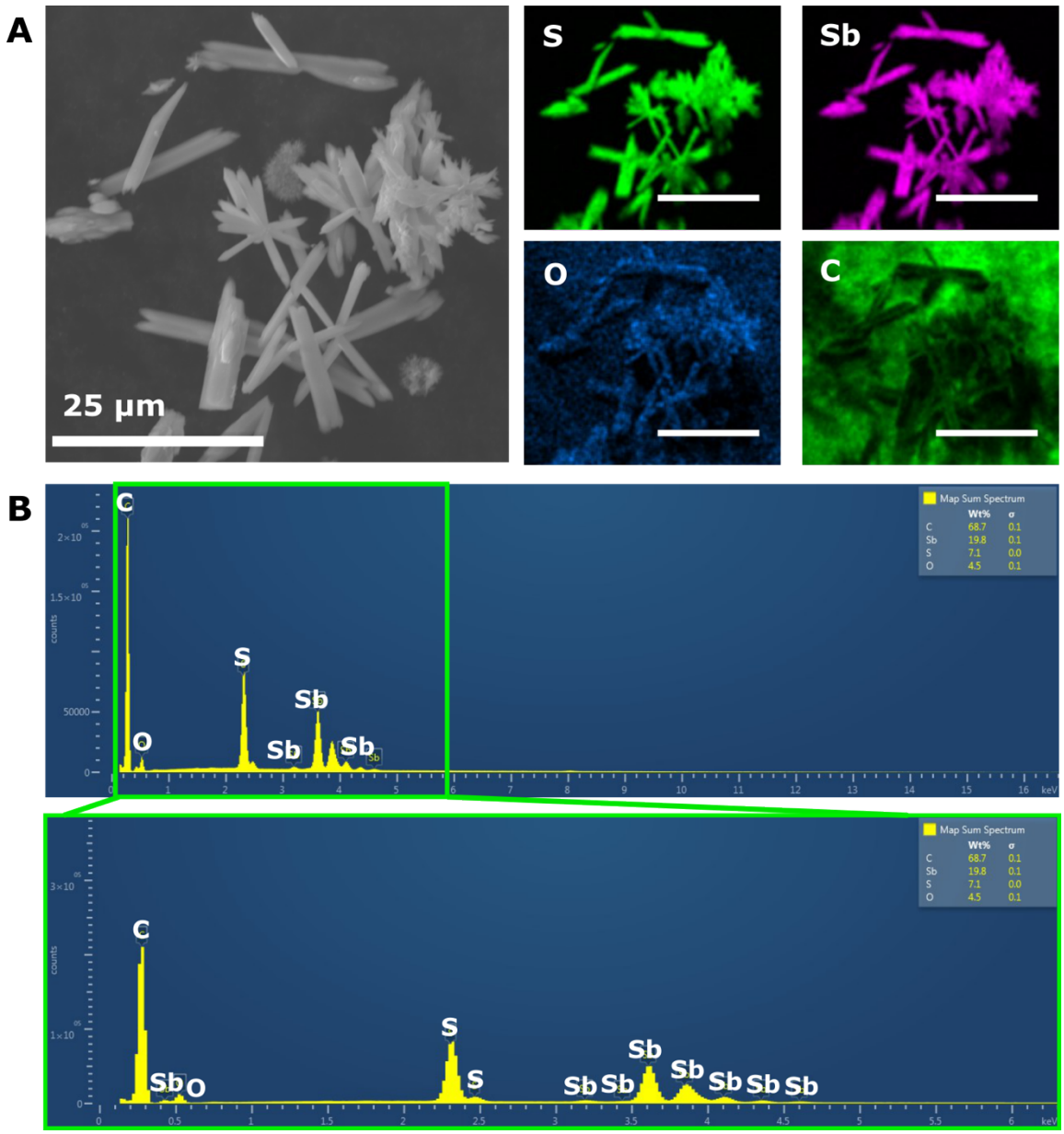


**Figure S3.** EDX mapping of the microrobots. (A) Electron micrograph of the sample and corresponding maps of S, Sb, O, and C. (B) EDX spectrum of the sample confirming the presence of S, Sb, O, and C. It is worth noting that the signal of O and C come from the carbon adhesive tape that was used for the fixation of the microrobots.

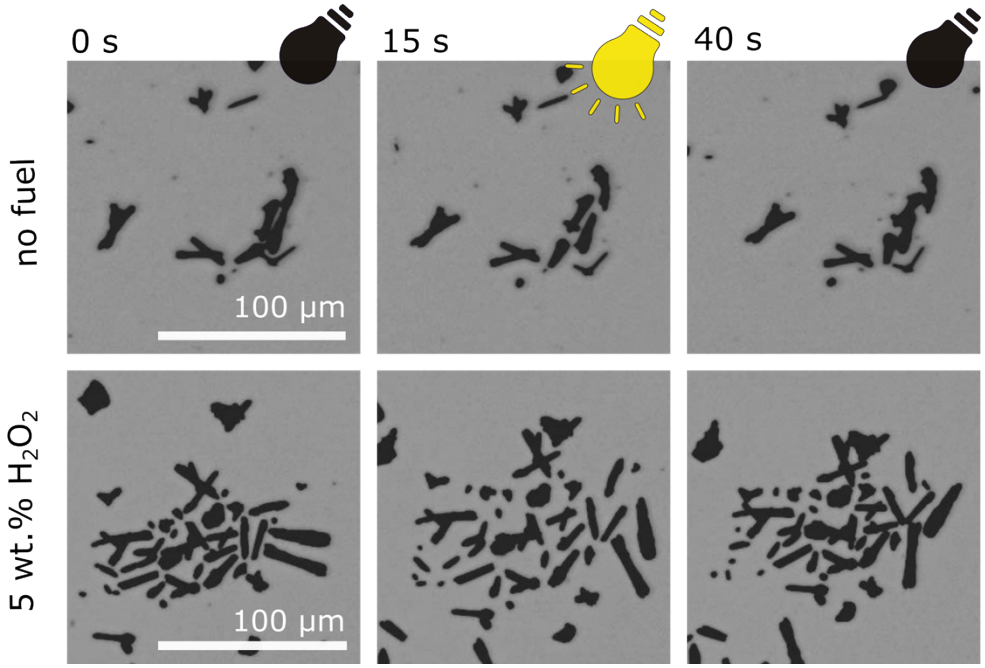


**Figure S4**. Collective swarming behavior of microrobots as a function of UV irradiation. Comparison of fueled and non-fueled microrobots. The micrographs are identical to the ones in **Figure 4** without any labels.

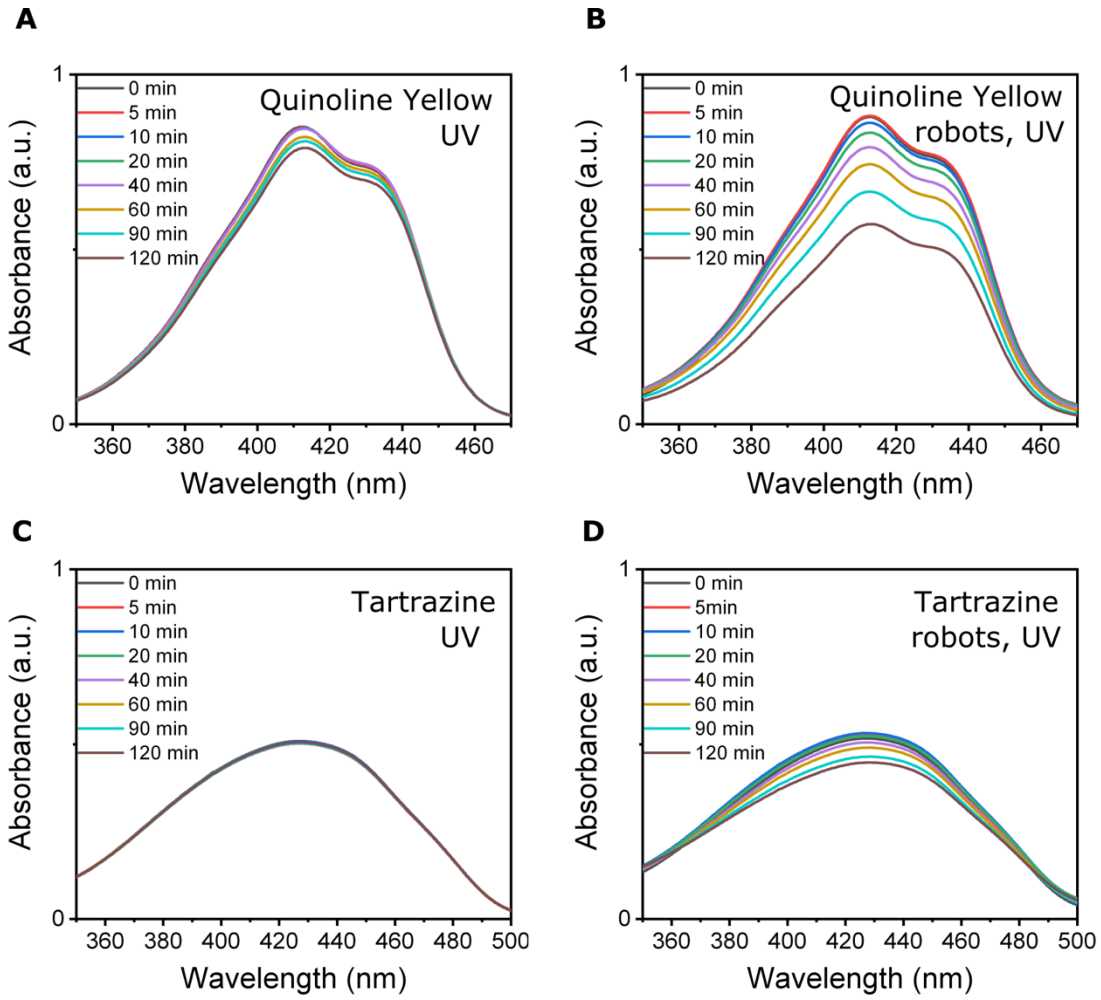


**Figure S5.** Degradation of food dyes using microrobots. Absorption spectra from the degradation of quinoline yellow (A, B) and of tartrazine (C, D). Control experiments during only UV light exposure are presented (A, C) next to the results of the degradation using UV-light-powered microrobots (B, D).

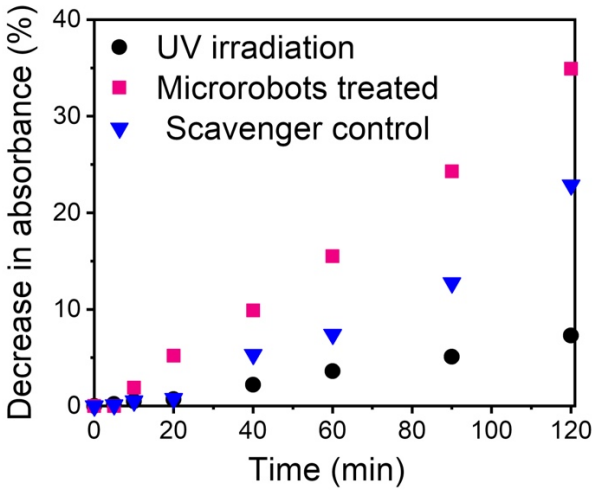


**Figure S6.** Photocatalytic degradation of quinoline yellow. Comparison of different conditions during the photocatalytic experiment: control experiment of UV irradiated quinoline yellow solution ("UV irradiation"), microrobots treated quinoline yellow under UV irradiation ("microrobots treated"), microrobots treated quinoline yellow under UV irradiation in the presence of EDTA as scavenger ("scavenger control").