

SUPPORTING INFORMATION

Electrokinetic Manipulation of Silver and Platinum Nanoparticles and Their Stochastic Electrochemical Detection

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Table of Contents:

Results of analyses of Ag and Pt NPs using Nanosight.....	S-2
Example of determination of the optimum ac heating frequency.....	S-3
Dependence of the frequency of collisions of Ag NPs on their concentration.....	S-3
Optical photomicrographs showing accumulation (and the absence of it) of Ag NPs.....	S-4
Additional chronoamperograms corresponding to the oxidation of Ag NPs.....	S-5
Results of the control experiments.....	S-6
Histograms showing the distribution of the data presented in Fig. 1.....	S-7
Histograms showing the distribution of the data presented in Fig. 3.....	S-8

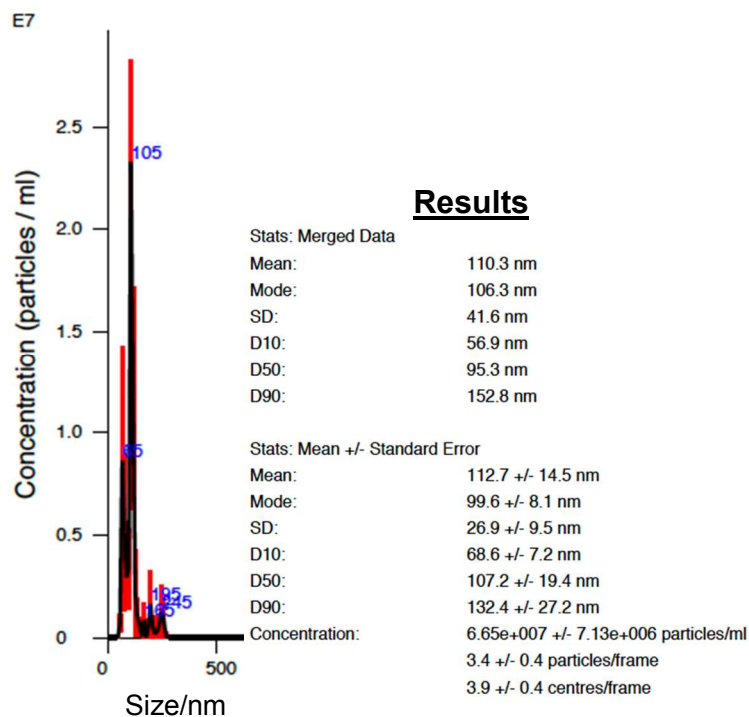


Figure S1. Results of analysis of Ag NPs using Nanosight.

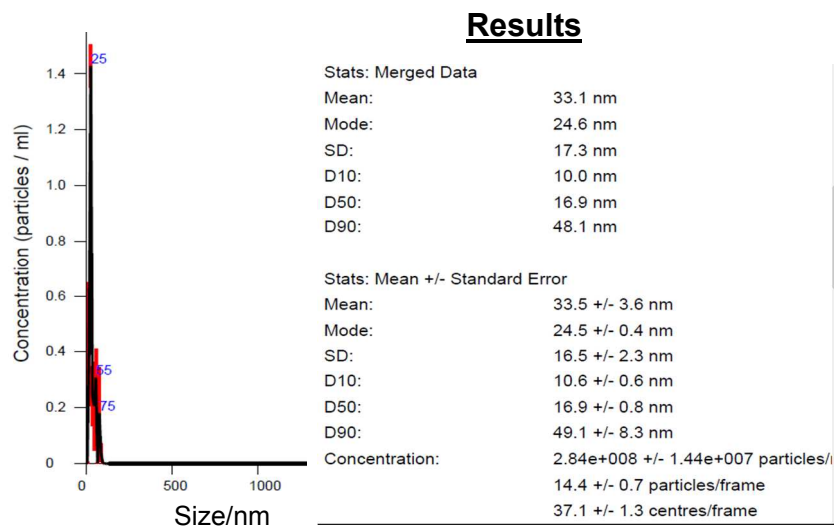


Figure S2. Results of analysis of Pt NPs using Nanosight.

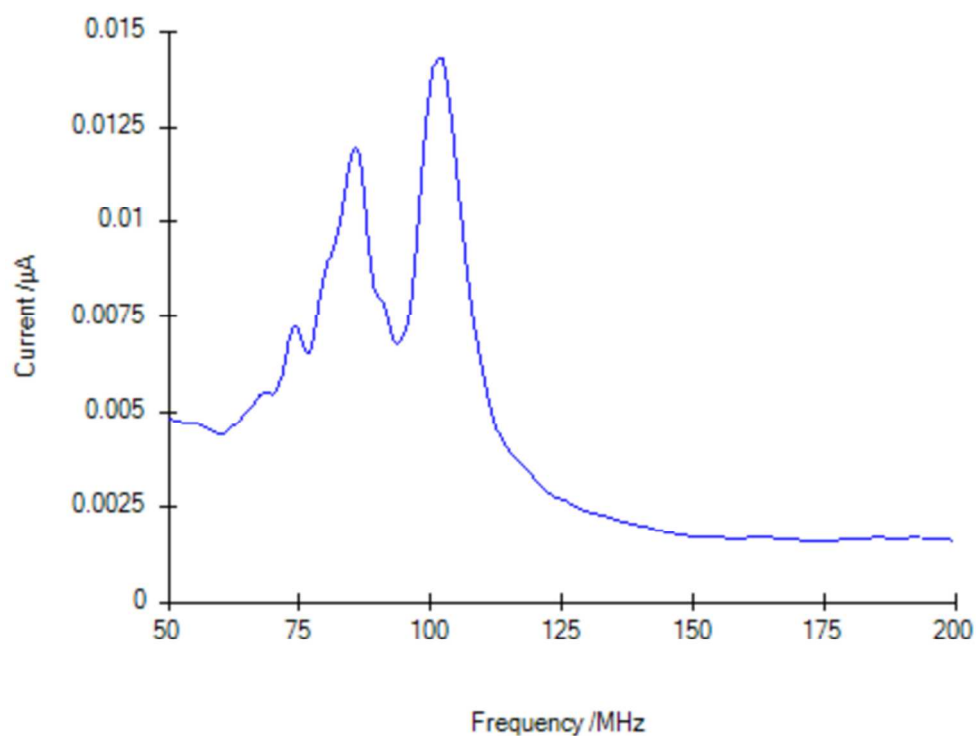


Figure S3. Current corresponding to water oxidation as a function of frequency of applied ac waveform (power 23.8 dBm) recorded with an 11 μm carbon working electrode, Ag | AgCl reference electrode, and platinum auxiliary electrode, in a solution of 100 mM citrate buffer, pH 3.8. Potential of the working electrode +1.5 V vs reference.

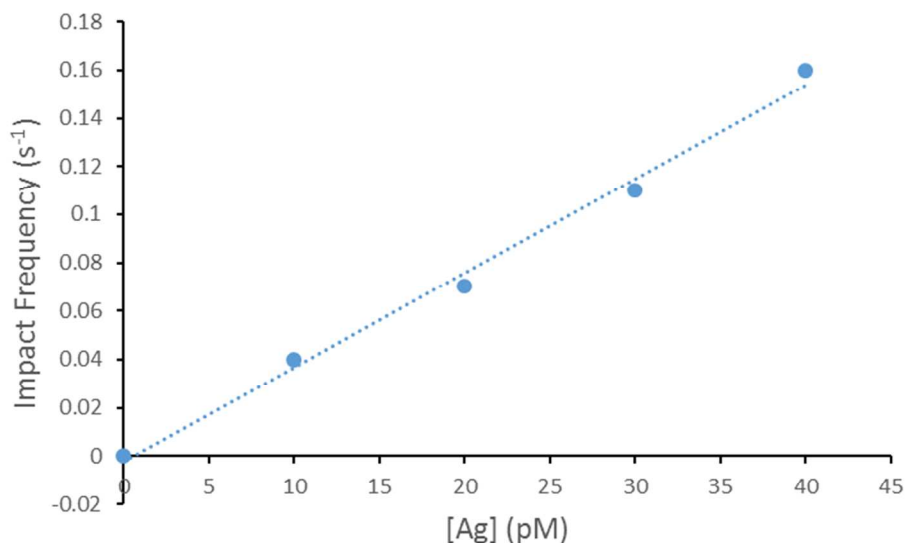


Figure S4. Impact frequency as a function of silver NP concentration (112.7 ± 14.5 nm diam.) recorded at room temperature. Frequencies are based on 300 s chronoamperograms. Other experimental conditions are the same as in Fig. 1 in the main text.

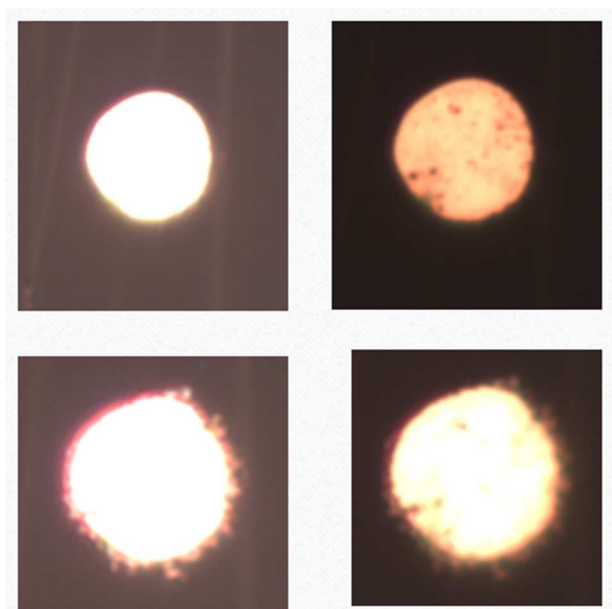


Figure S5. Before (top) and after (bottom) optical images of a 10 μm Au electrode. The latter images were taken after recording a 1000 s chronoamperogram with 3 pM Ag NPs (90.0 ± 0.8 nm diam.) in a 20 mM KNO_3 , 8 mM trisodium citrate solution, with a $\text{Ag} | \text{AgCl}$ reference electrode, platinum auxiliary electrode, and an applied ac signal of 95.7 MHz at 16 dBm. Potential of the working electrode +0.5 V vs the reference. Note accumulation of Ag NPs at the disk circumference.

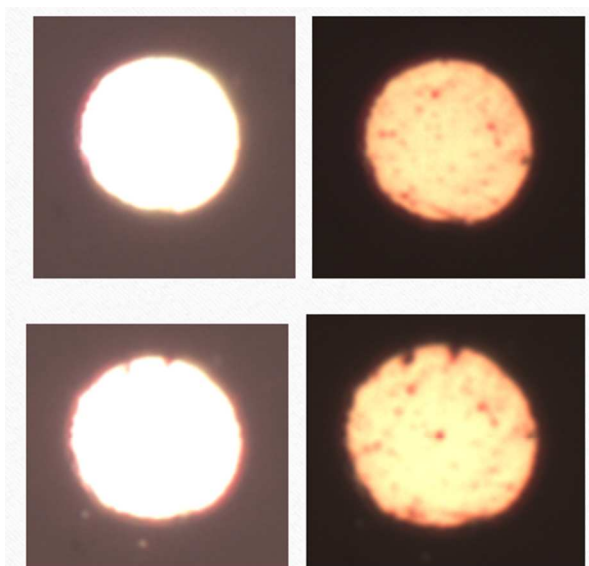


Figure S6. Before (top) and after (bottom) optical images of a 10 μm Au electrode. The latter images were taken after recording a 1000 s chronoamperogram with 50 fM Ag NPs (90.0 ± 0.8 nm diam.) in a 20 mM KNO_3 , 8 mM trisodium citrate solution, with a $\text{Ag} | \text{AgCl}$ reference electrode, platinum auxiliary electrode, and an applied ac signal of 95.7 MHz at 26 dBm. Potential of the working electrode +0.5 V vs the reference. Note that the 'before' and 'after' images look somewhat different because the electrode was repolished in between. Nevertheless, no Ag NP accumulation is observed.

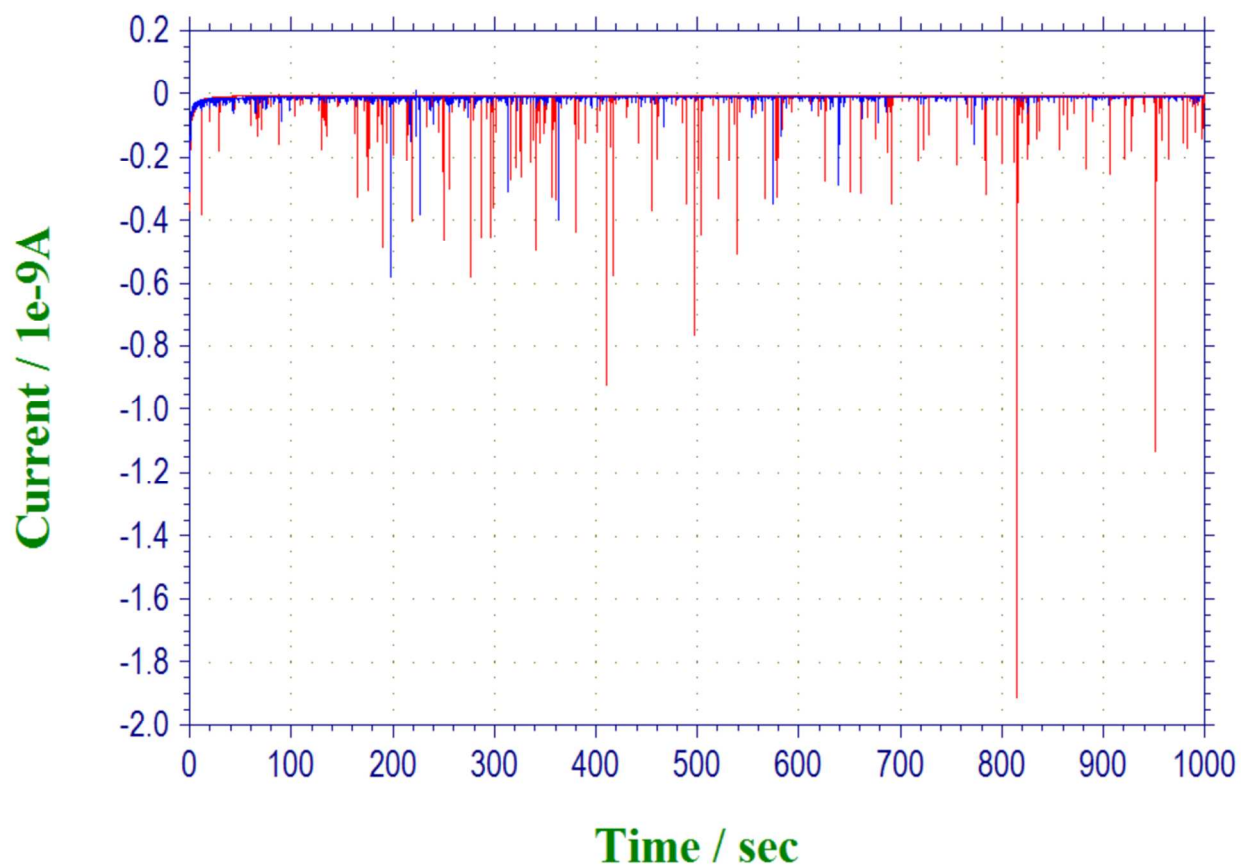


Figure S7. Overlay of the chronoamperograms of the experiments described in the optical pictures in Figs. S5 and S6. The blue line is the experiment done at 16 dBm (photomicrograph in Fig. S5), and the red line is the experiment done at 26 dBm (photomicrograph in Fig. S6).

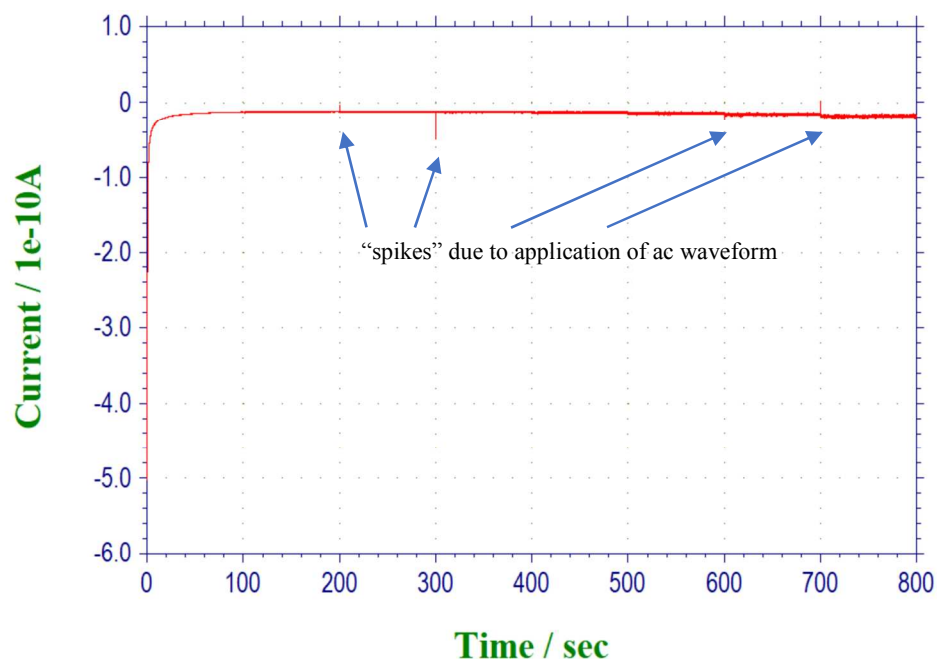


Figure S8. Chronoamperogram for an 11 μm carbon working electrode, Pt auxiliary electrode, Ag | AgCl reference electrode, in a 100 mM citrate buffer, pH 3.8 (conditions the same as in Fig. 1 in the main text). The first 100 s is at room temperature; then, every 100 s at an ac signal of 102 MHz, the power is increased to 16, 19, 20.8, 22, 23, 23.8, and 24.4 dBm, respectively.

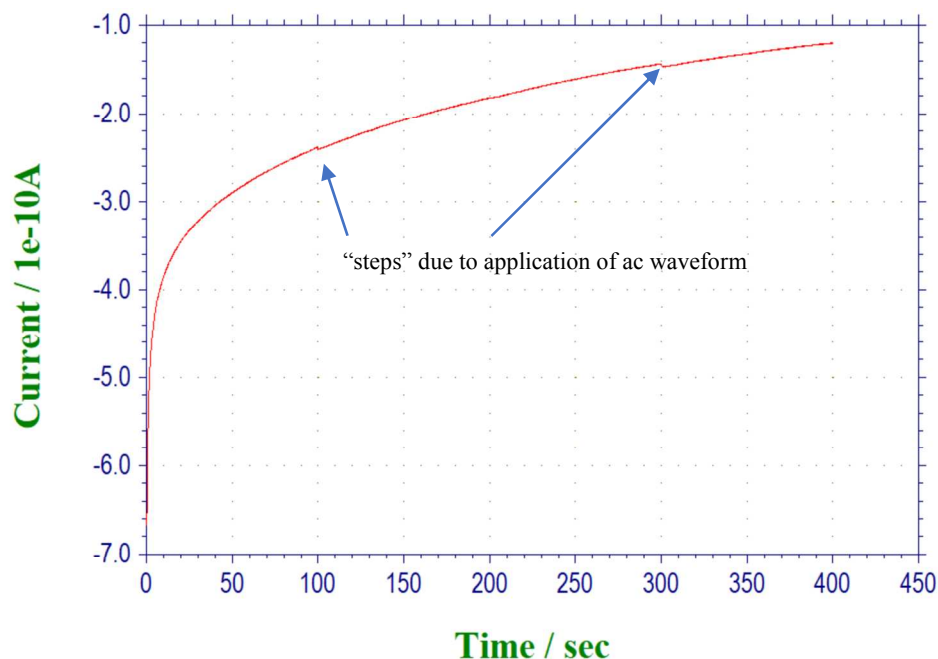


Figure S9. Chronoamperogram for a 10 μm gold working electrode, Pt auxiliary electrode, Ag | AgCl reference electrode, in a 15 mM hydrazine, 50 mM sodium phosphate buffer solution, pH 7.5 (conditions the same as in Fig. 3 in the main text). The first 100 s are at room temperature; then, every 100 s at an ac signal of 97 MHz the power was increased to 9, 12, and 13.8 dBm, respectively.

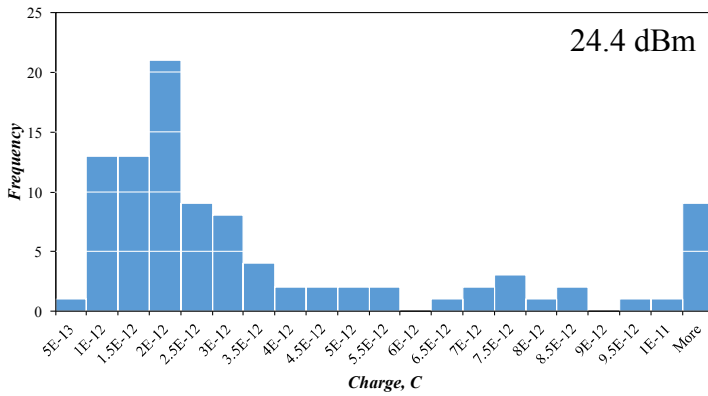
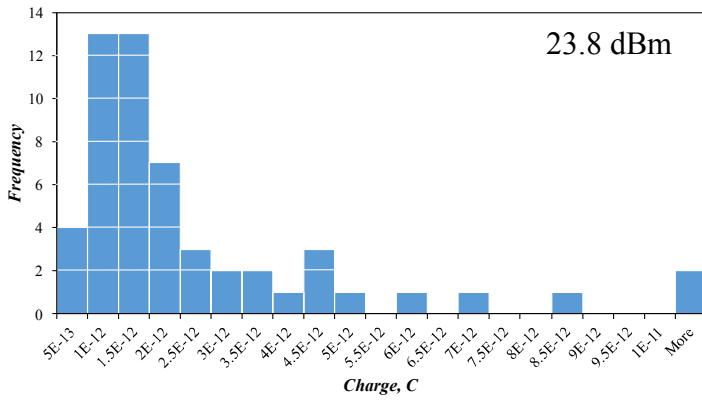
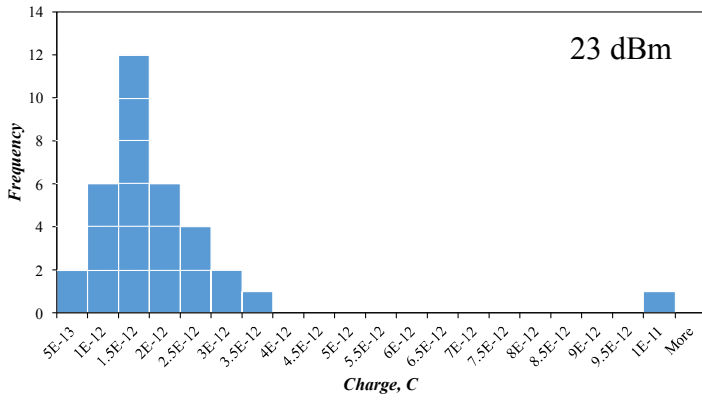
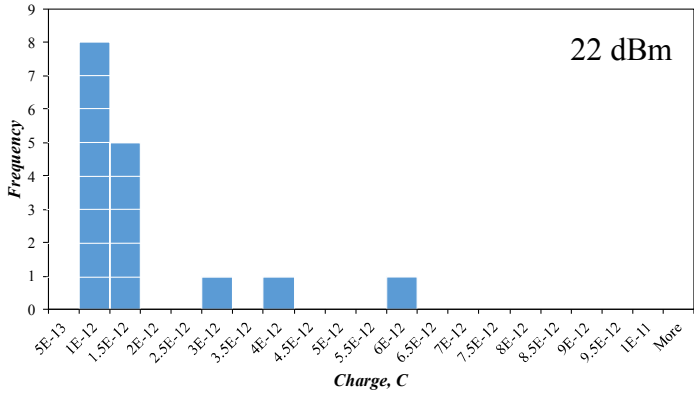


Figure S10. Histograms showing the distribution of the data presented in Fig. 1 in the main text. Ac power indicated on each of the histograms.

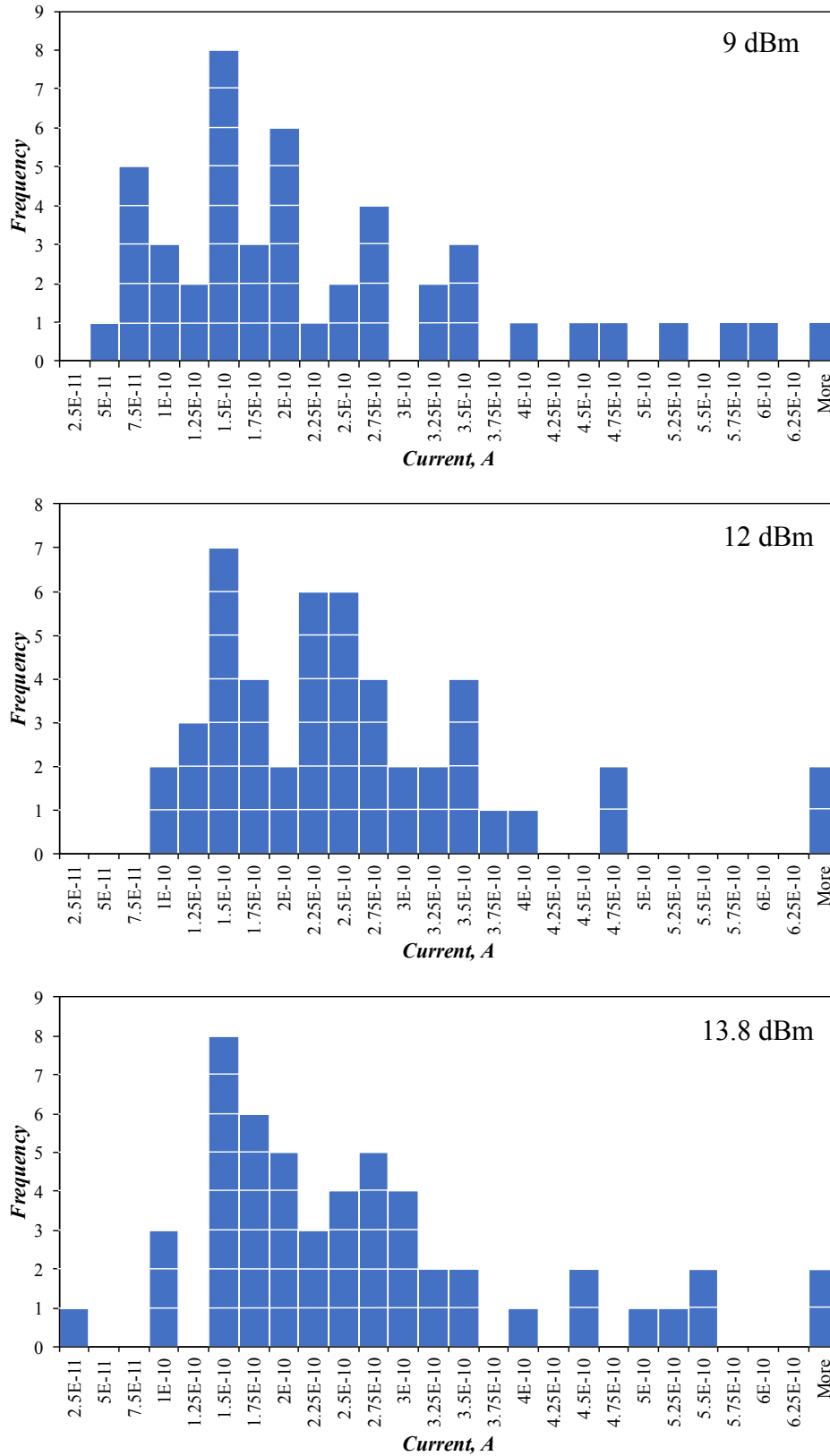


Figure S11. Histograms showing the distribution of the data presented in Fig. 3 in the main text. Ac power indicated on each of the histograms.