

## Supporting Information

# The memristive implementation of the hippocampus: A hypothesis

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Table S1: ON/OFF ratio for different antisolvent samples

antisolvent	LRS/HRS ratio
ethyl acetate	$I_{\text{LRS}}/I_{\text{HRS}} = 1.1/0.85 = 1.29$
diethyl ether	$I_{\text{LRS}}/I_{\text{HRS}} = 3.1/1.9 = 1.63$
chlorobenzene	$I_{\text{LRS}}/I_{\text{HRS}} = 0.7/0.35 = 2$

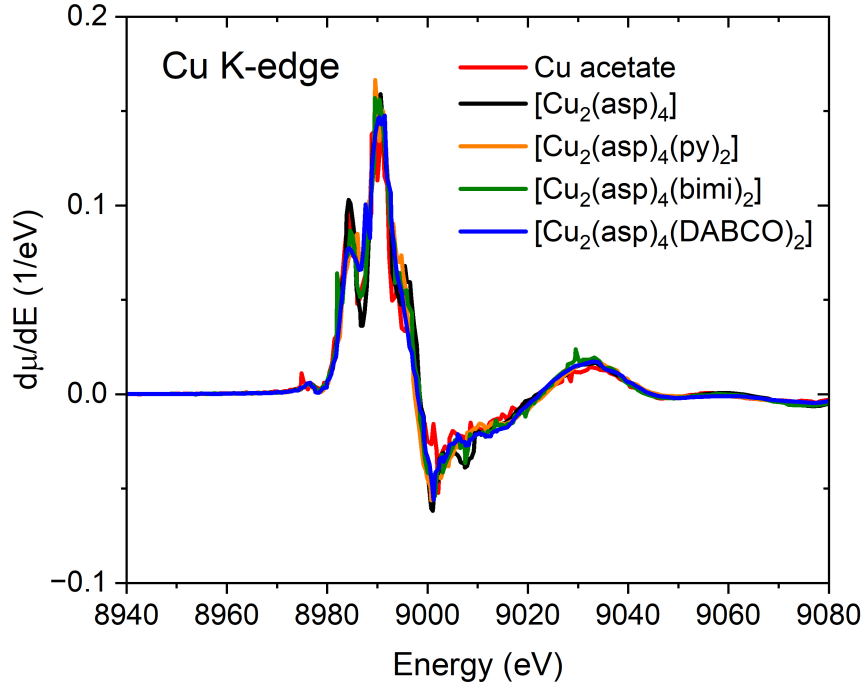


Figure S1: The first derivative of the Cu K-edge XANES spectra for the studied copper aspirinate complexes and copper acetate monohydrate reference with respect to energy.

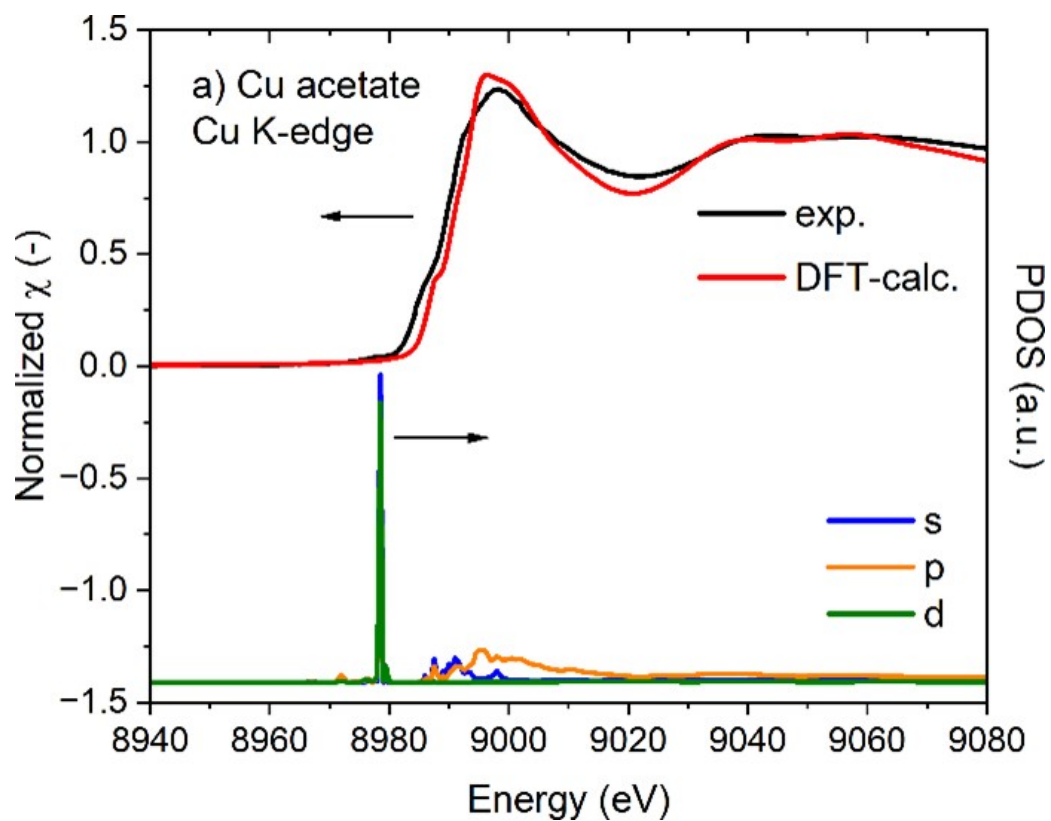


Figure S2: Experimental (black) and DFT-calculated (red) XAS spectra for copper (II) acetate monohydrate at Cu K-edge. The projected density of the states projected on the absorbing Cu atom is plotted on the right y-axis.

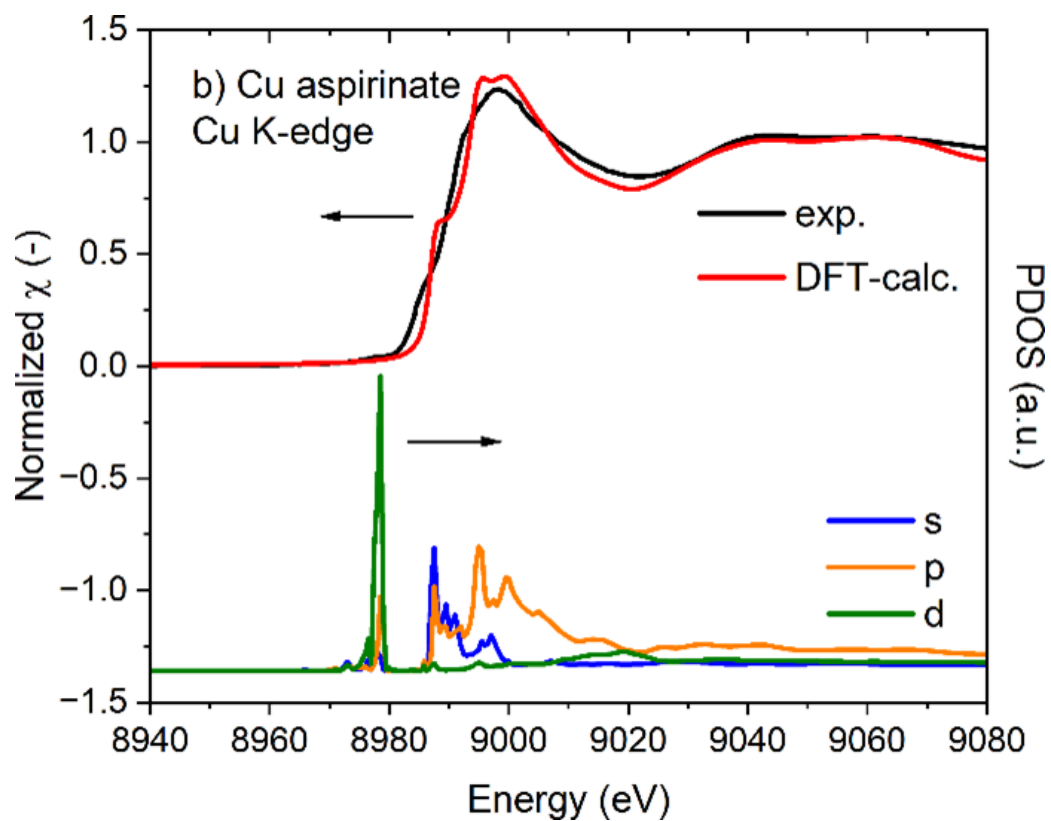


Figure S3: Experimental (black) and DFT-calculated (red) XAS spectra for copper (II) acetate monohydrate at Cu K-edge. The projected density of the states projected on the absorbing Cu atom is plotted on the right y-axis.

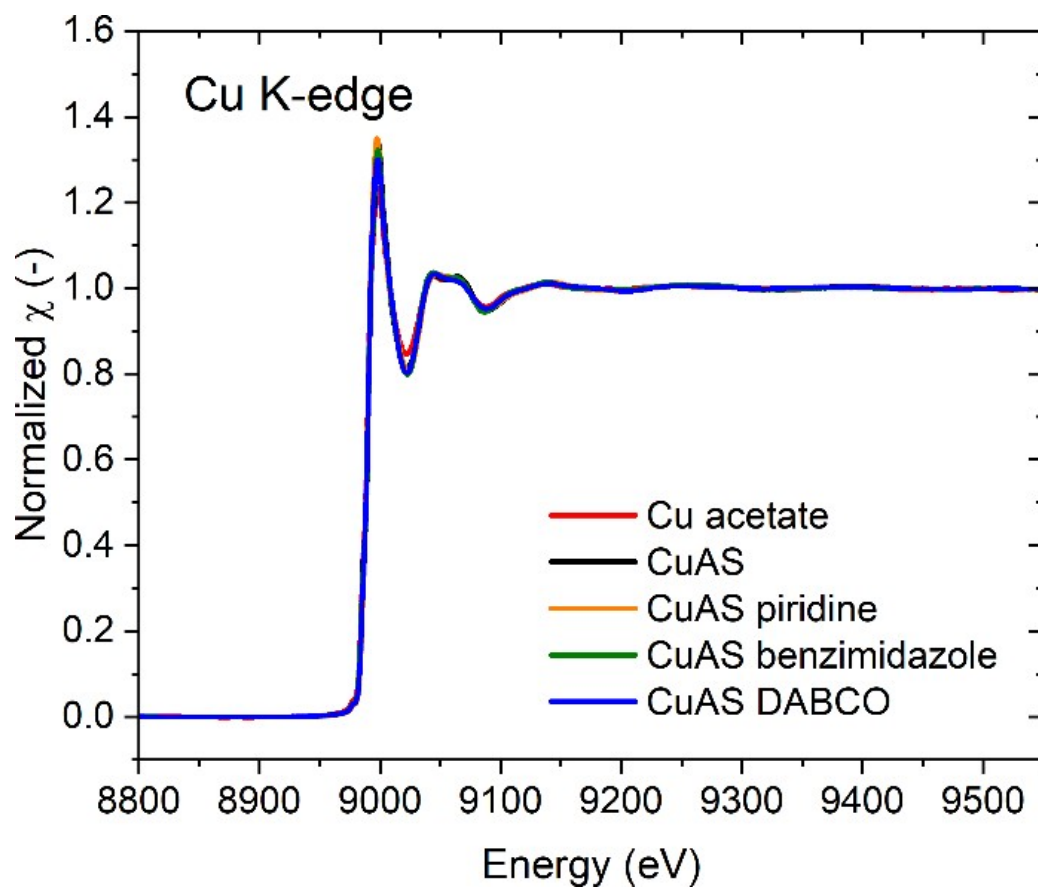


Figure S4: Cu K-edge XAS spectra for the studied copper aspirinate complexes and copper acetate monohydrate reference.

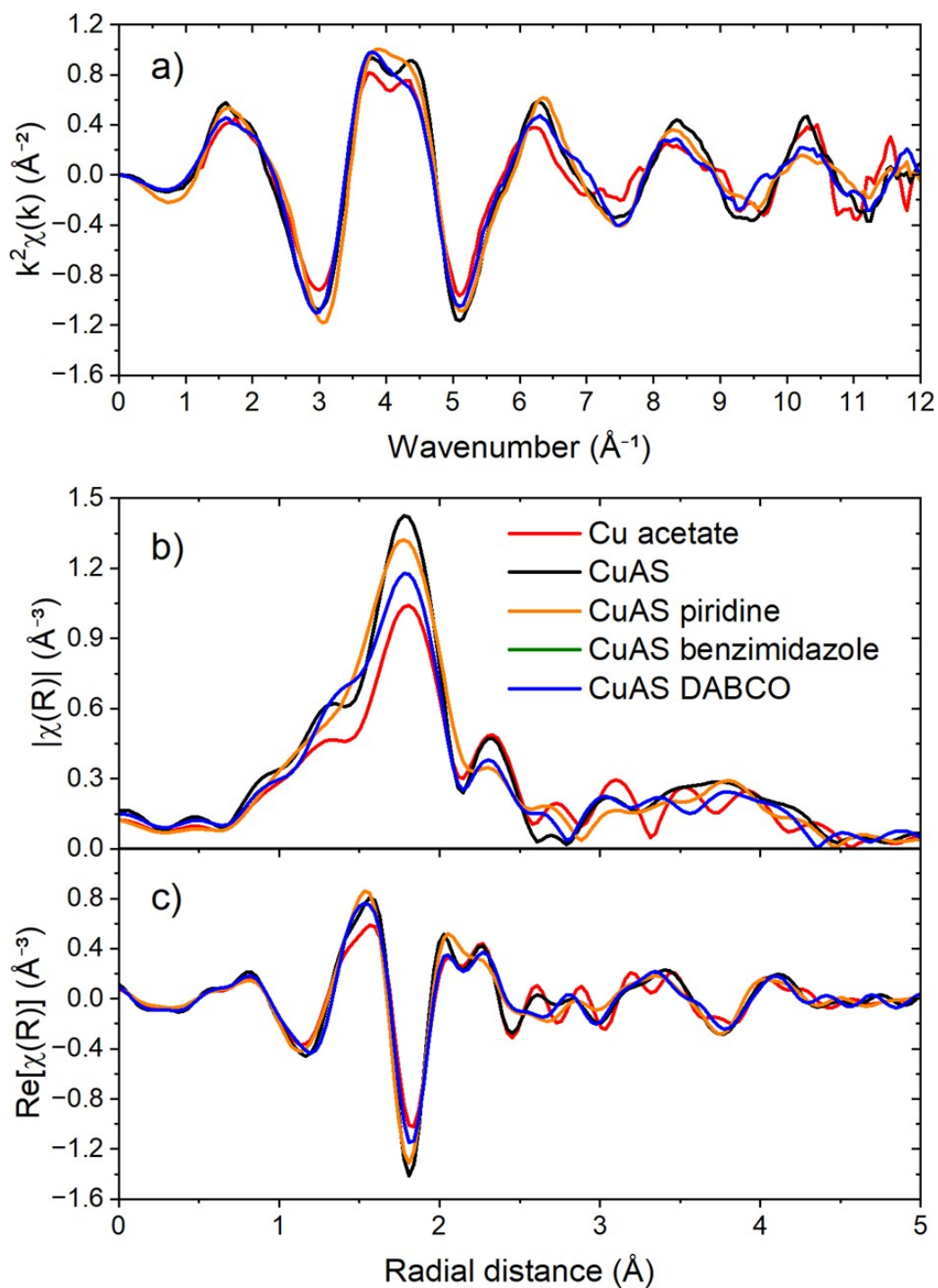


Figure S5: Cu K-edge EXAFS for the references are presented as  $\chi(k)k^2$  in k-space (top) and after Fourier transform in R-space (bottom).

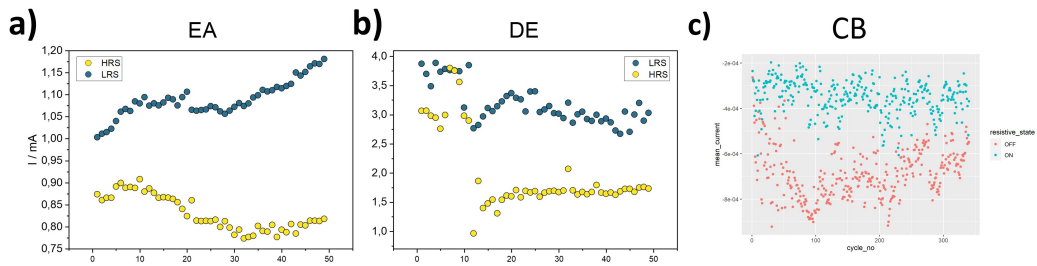


Figure S6: ON/OFF ratio for the antisolvent-based samples: a) ethyl acetate (EA), b) diethyl ether (DE) and c) chlorobenzene (CB). Samples were switched with switching voltage of  $\pm 2$  V with the following reading pulses of  $+500$  mV. Mean values of electric current in states ON (LRS) and OFF (HRS) were measured and used in further analysis.

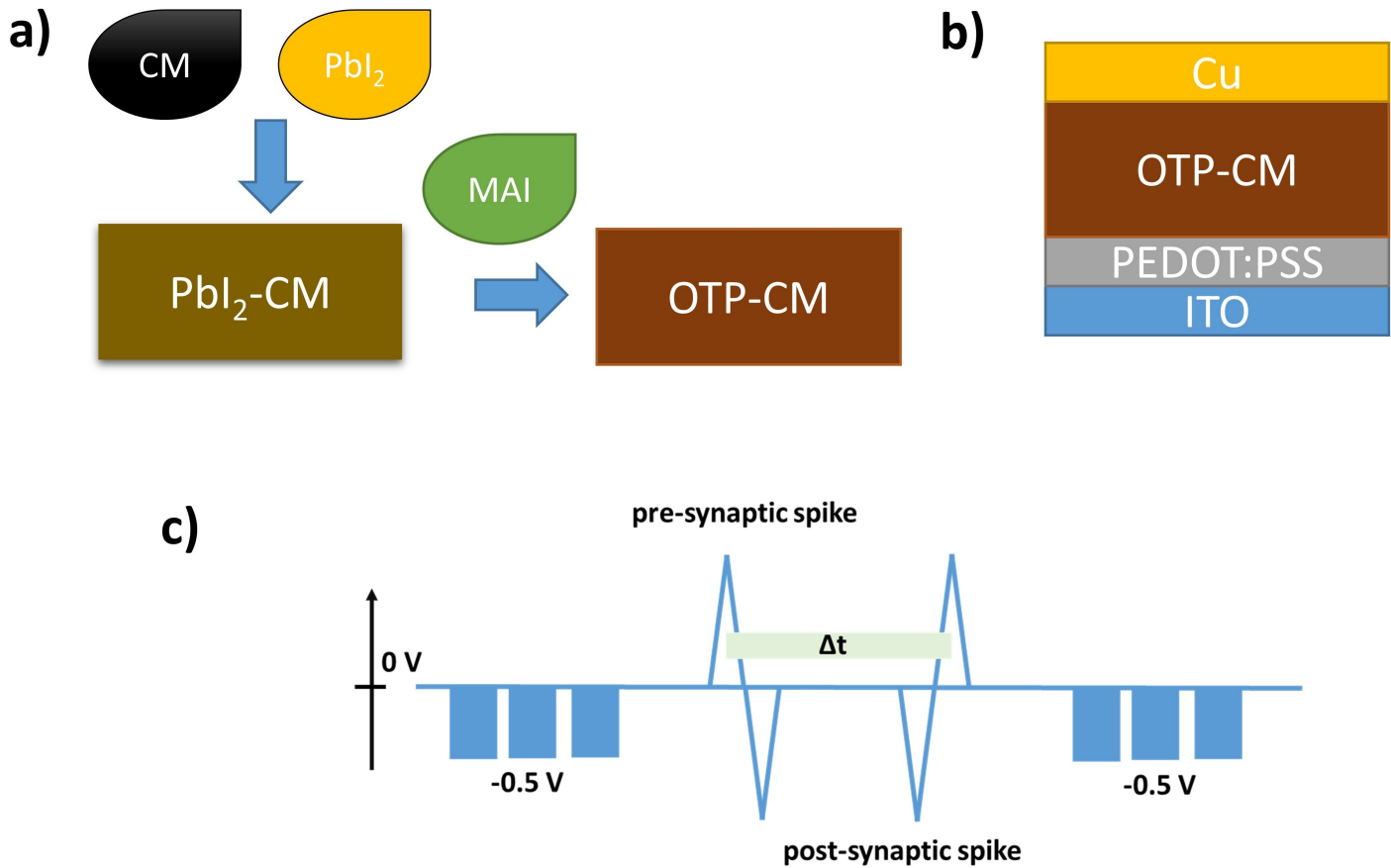


Figure S7: a) device preparation scheme –incorporation of carbon material additives into the  $\text{PbI}_2$  layer and further synthesis of the modified perovskite samples. B) Device architecture – ITO as bottom electrode and Cu as top electrode. C) Spike time-dependent plasticity voltage profile of the experiment for the potentiation part – where the post-synaptic pulse happens after  $\Delta t$  after pre-synaptic pulse.