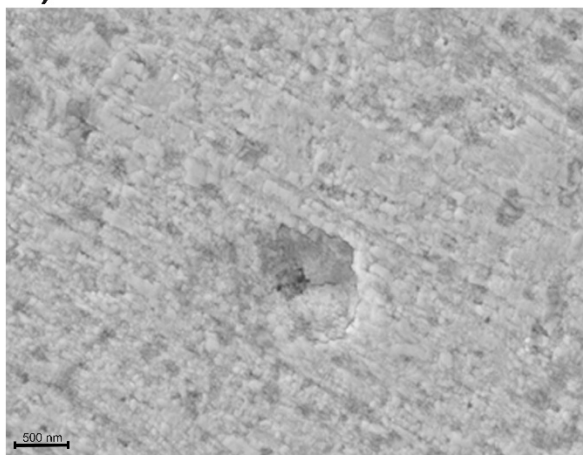
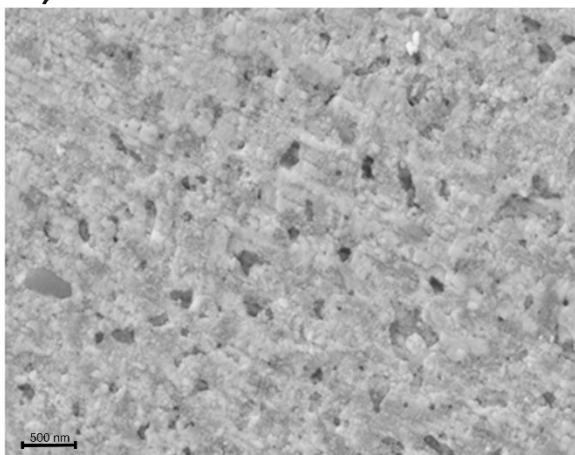


Sina is a Ph.D. student in the Department of Chemistry at Western University. He is working under the supervision of Dr. Jamie Noël and his research has focused on the pitting probability of Cu under Deep Geological Repository (DGR) conditions. Cu has sufficient corrosion resistance in different environments such as deaerated conditions; however, localized corrosion might occur resulting from the presence of aggressive anions, oxygen, or an increase of the pH. As a result, the susceptibility of Cu to localized corrosion, specifically pitting, must be considered carefully to avoid any unpredictable failures. Sina has conducted electrochemical techniques and statistical analysis to investigate the pitting probability of Cu in unary and binary solutions containing chloride, sulfate, and carbonate. Moreover, he has employed surface-sensitive techniques including scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), Auger electron spectroscopy (AES), and X-ray diffraction (XRD) to evaluate the stochastic nature of passive film formation, morphology, and composition on the Cu.

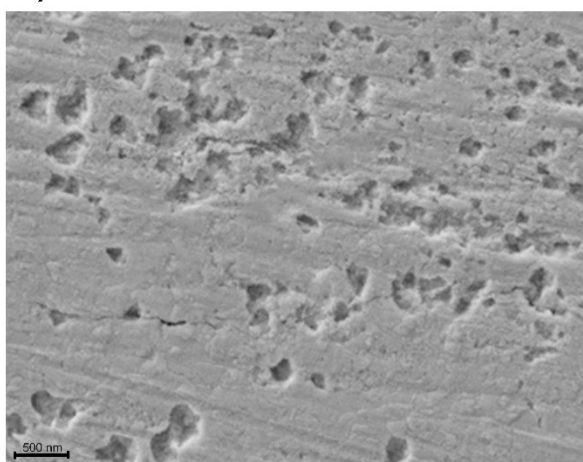
a)



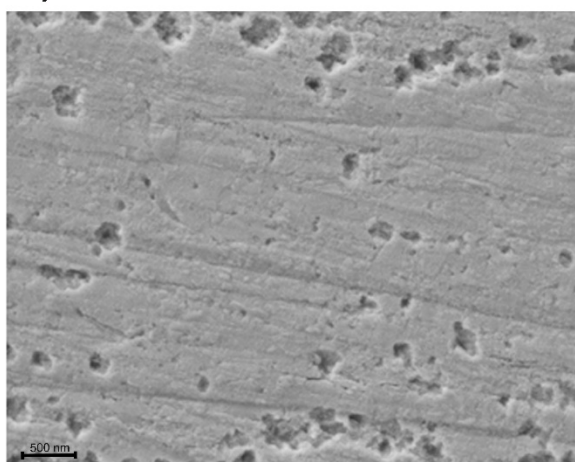
b)



c)

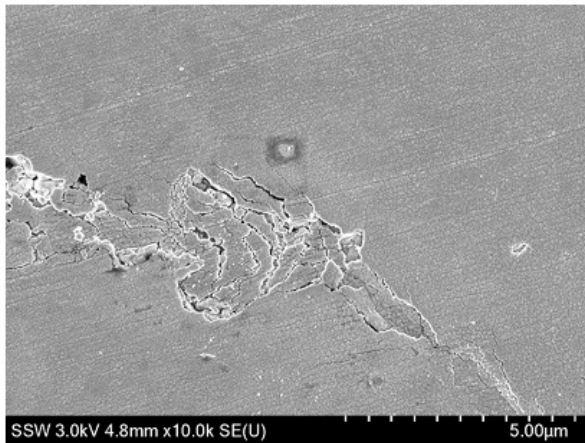


d)

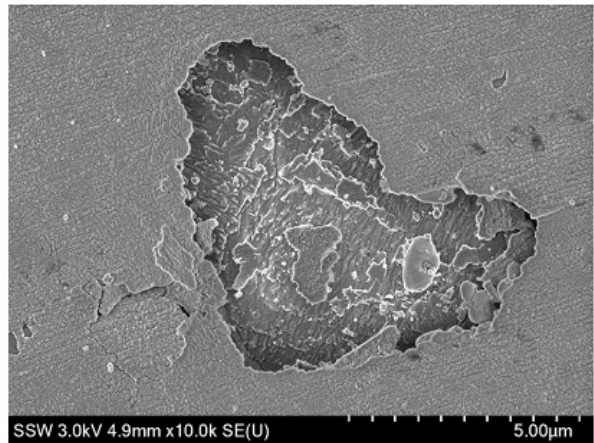


Scanning electron microscopy (SEM) images of Cu after pitting experiments in 1 M NaCl solution. a,b) Passive film morphology of Cu at lowest E_b , c,d) Passive film morphology of Cu at highest E_b .

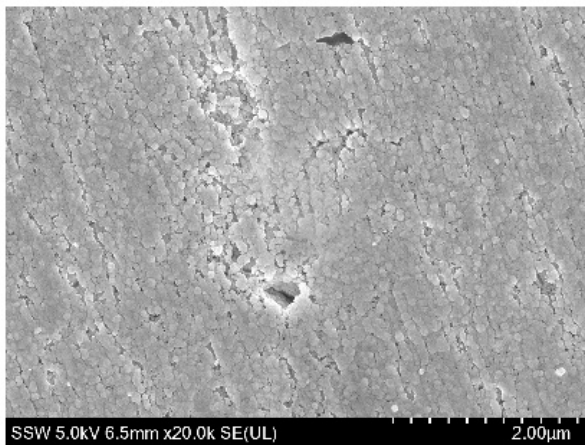
a)



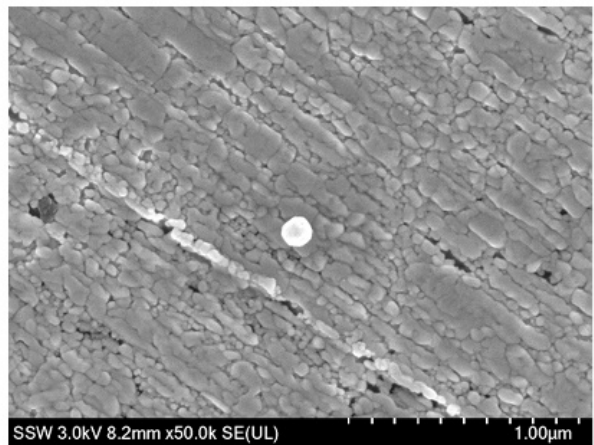
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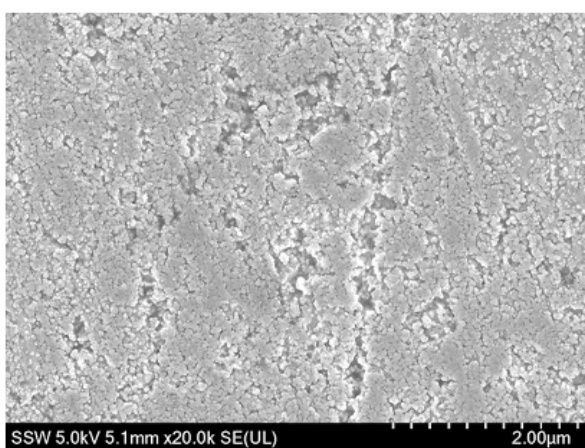
c)



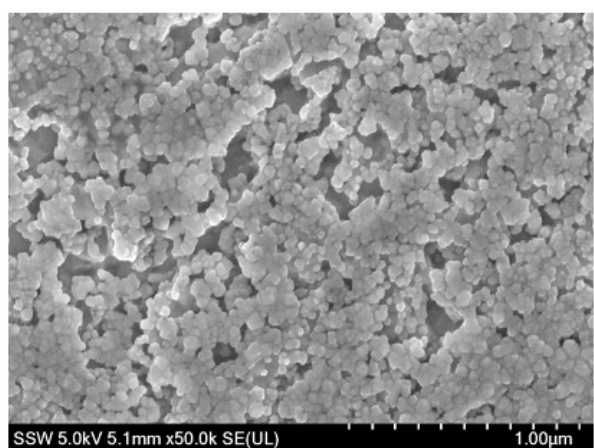
d)



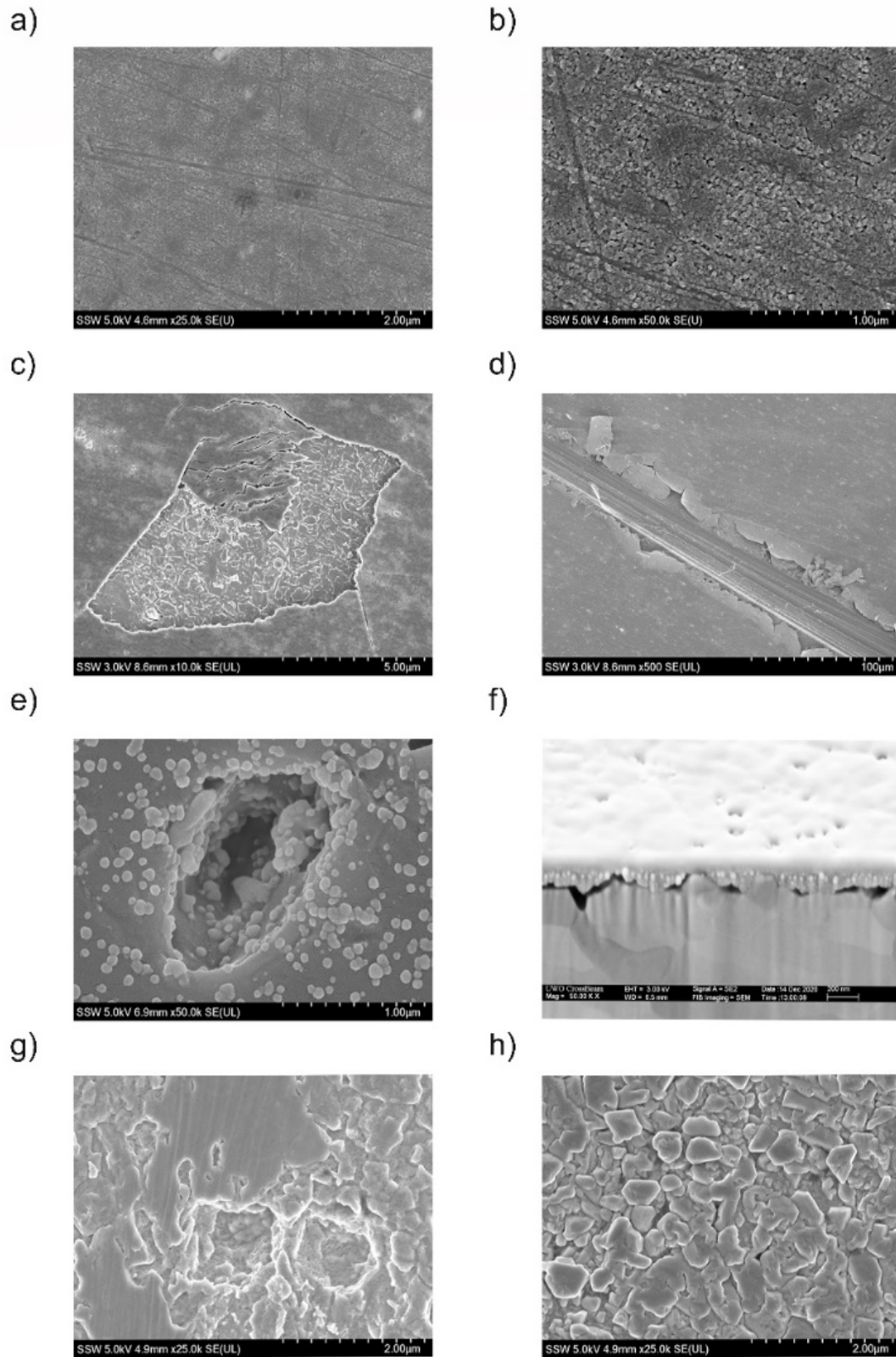
e)



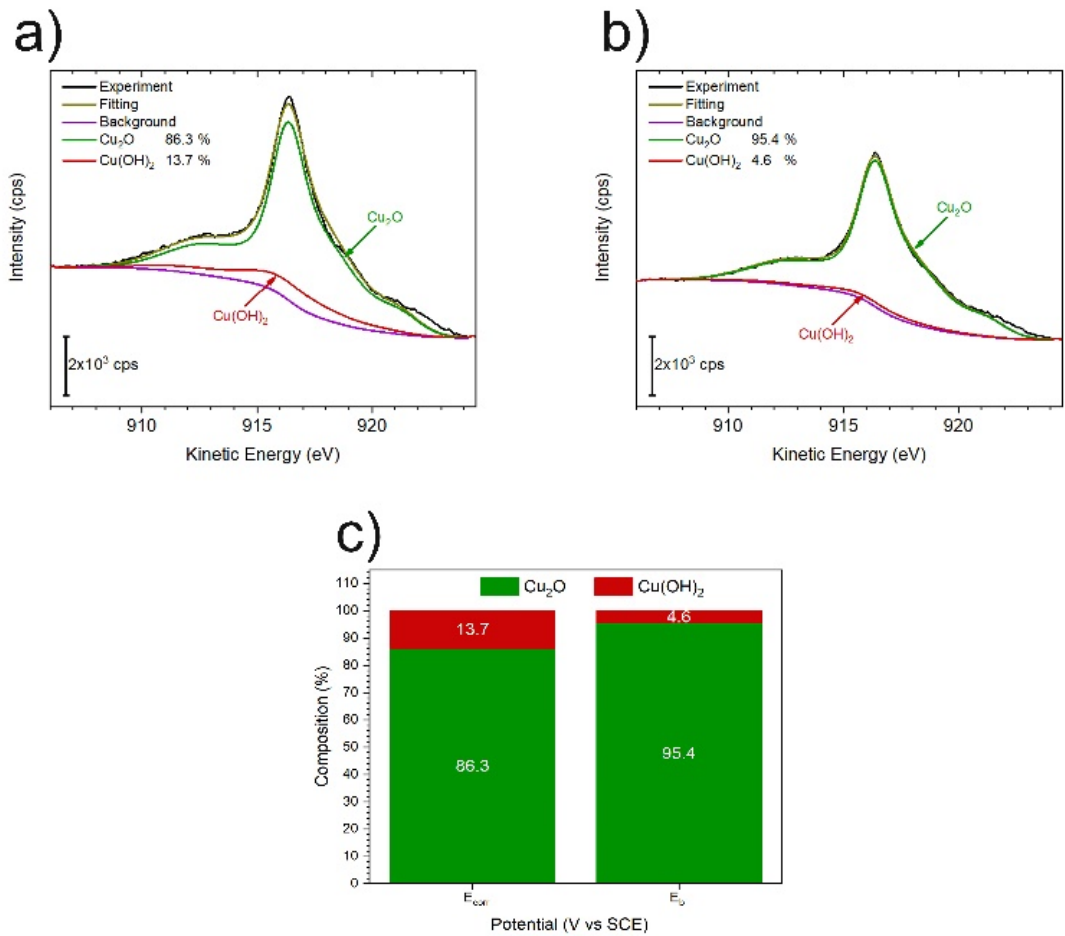
f)



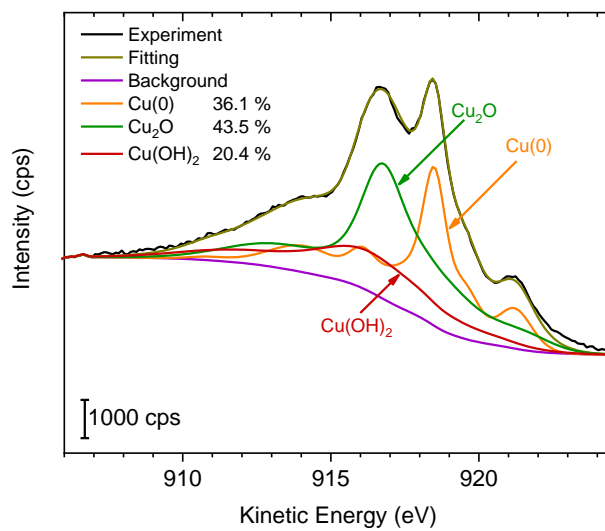
passive film morphology of Cu in buffer solution with different $[Cl^-]$ a,b) 0.01 M $[Cl^-]$ c,d) 0.1 M $[Cl^-]$ e,f) 1 M $[Cl^-]$.



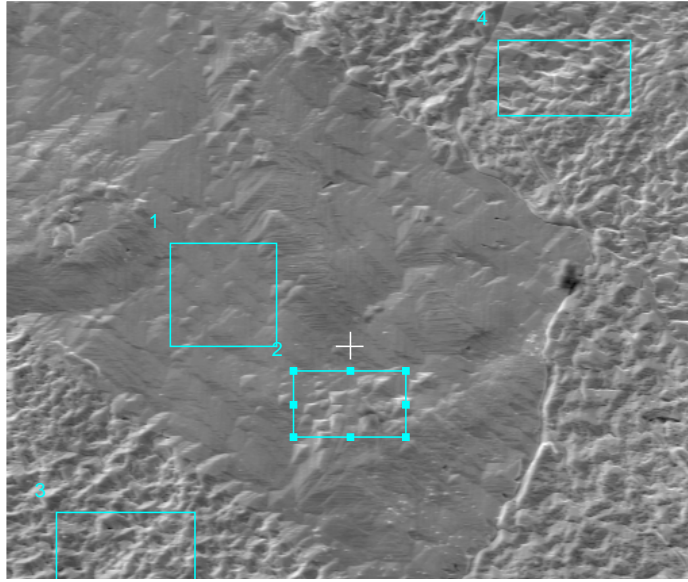
surface morphology of Cu in buffer solution with 0.01 M [Cl⁻] a,b) E_{corr} c-e) E_B before film removal f) FIB image of passive film g,h) E_B after film removal



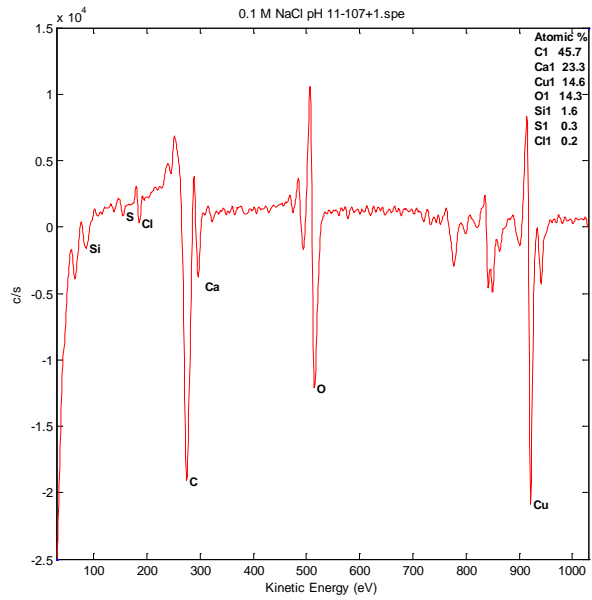
composition of passive films in buffer solutions with 0.1 M [Cl⁻] a) E_{corr} b) E_b c) Bar chart of E_{corr} and E_b .



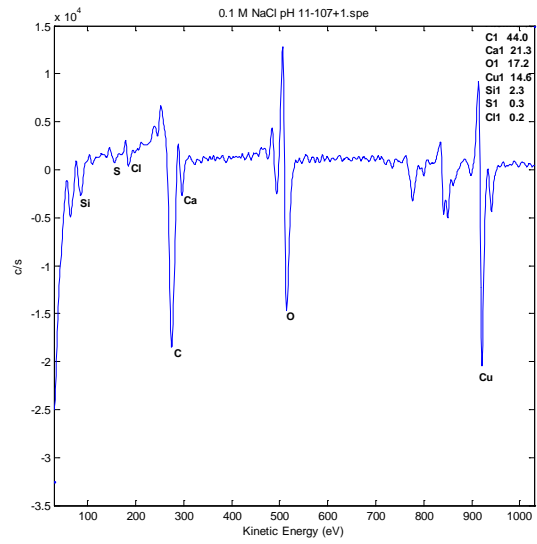
composition of passive films in a buffer solution containing 0.1 M [SO₄²⁻] at pH 9



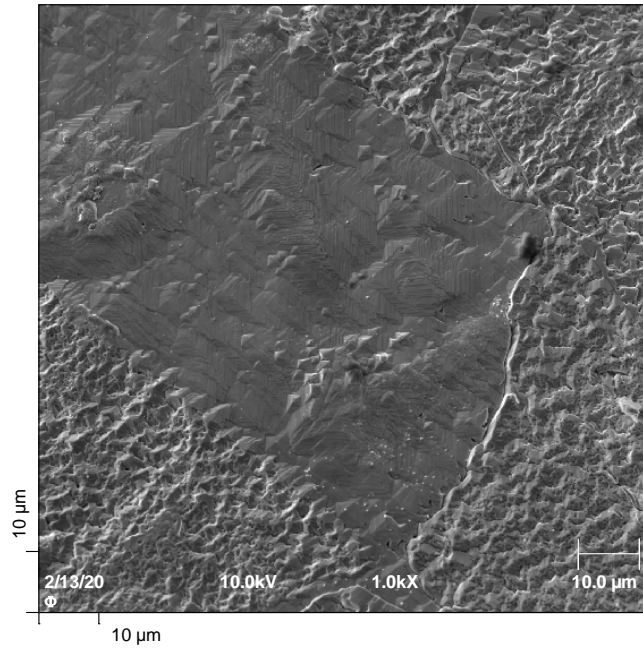
0.1 M NaCl pH 11-107+1.spe: 0.1 M NaCl pH 11 SSW
2020 Feb 13 10.0 kV 10 nA FRR 1.0572e+004 max 13.01 min
Sur1-A/1/1 (S9d7) RSF



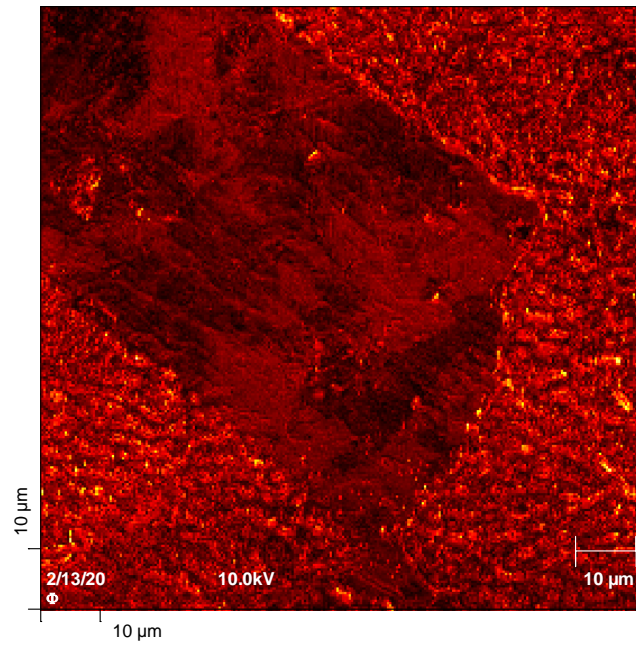
0.1 M NaCl pH 11-107+1.spe: 0.1 M NaCl pH 11 SSW
2020 Feb 13 10.0 kV 10 nA FRR 1.2837e+004 max 13.01 min
Sur1-1/2 (S9d7) RSF



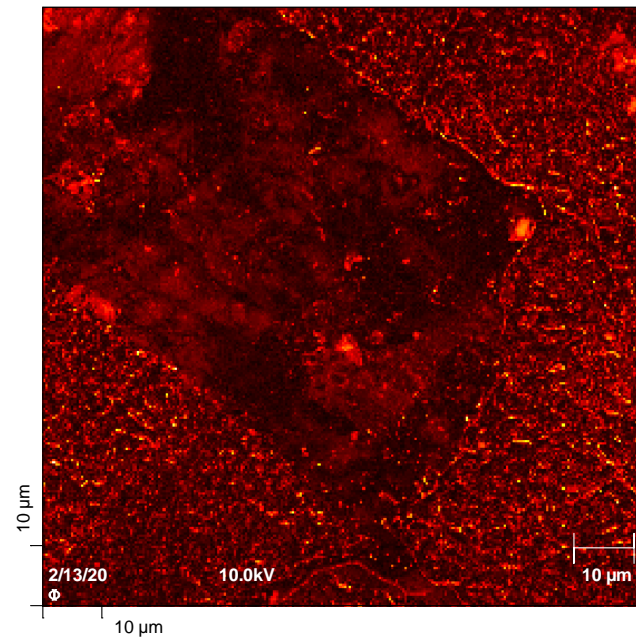
SEM



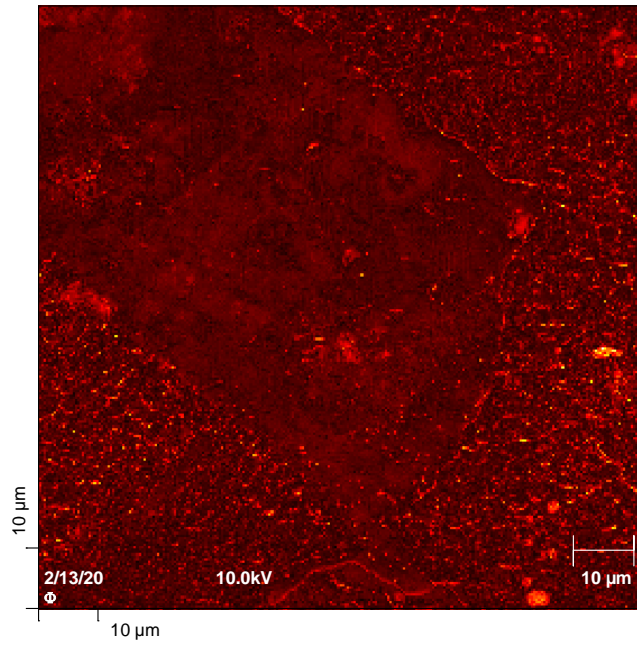
Cu1



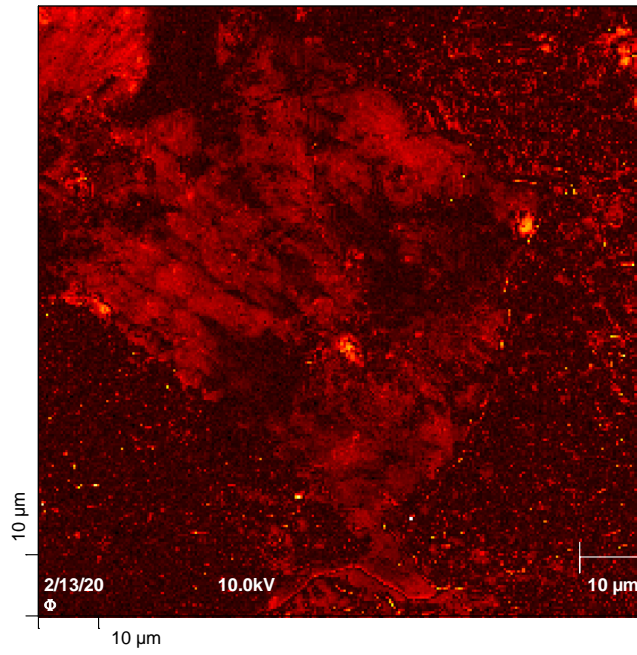
O1



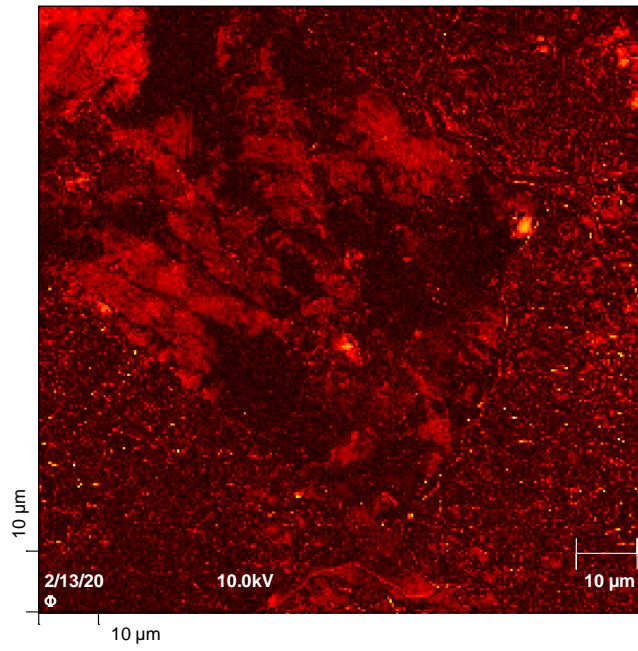
C1



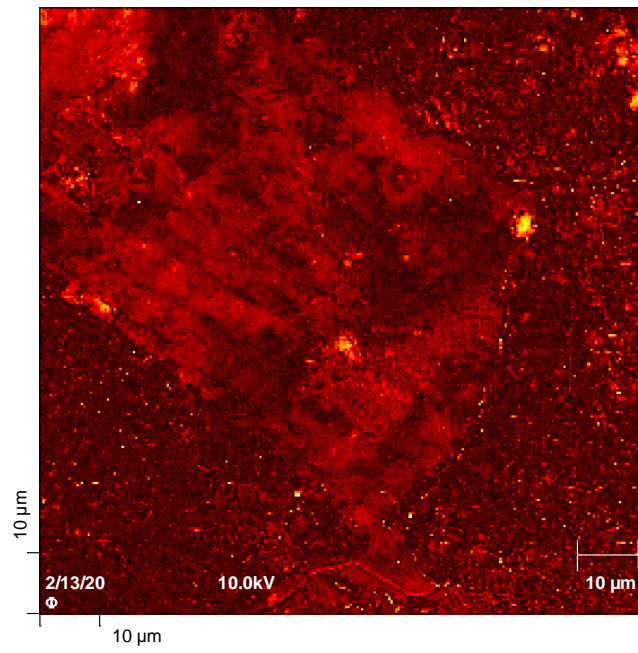
C11



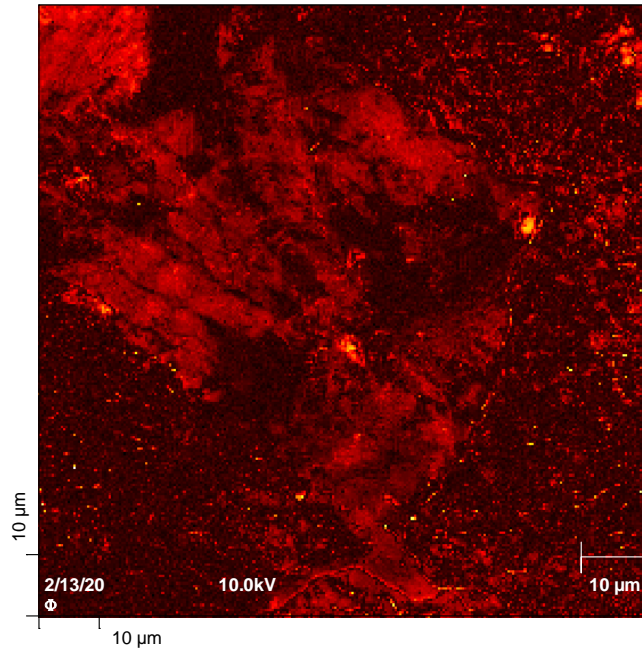
Si1



Ca1



S1



AES of Cu in solution with 0.1 M NaCl at pH 11