**Description of the supplementary materials**

Input files and other necessary documents for MOOSE simulations to reproduce this work have been provided, where

ely075Mpa\_conventional\_BV200x200.i: input file to simulate the system with electrolyte shear modulus of 75 MPa;

ely175Mpa\_conventional\_BV200x200.i: input file to simulate the system with electrolyte shear modulus of 175 MPa;

ely375Mpa\_conventional\_BV200x200.i: input file to simulate the system with electrolyte shear modulus of 75 MPa;

Files in directories “src” and “include” shall be put under MOOSE working directory before submitting any input files.