

Abstract Submitted
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Metal pad instabilities in liquid metal batteries¹ OLEG ZIKANOV,
Univ of Michigan - Dearborn — Strong variations between the electrical conductivities of electrolyte and metal layers in a liquid metal battery indicate the possibility of ‘metal pad’ instabilities. Deformations of the electrolyte-metal interfaces cause strong perturbations of electric currents, which, hypothetically, can generate Lorentz forces enhancing the deformations. We investigate this possibility using two models: a mechanical analogy and a two-dimensional linearized approximation. It is found that the battery is prone to instabilities of two types. One is similar to the sloshing-wave instability observed in the Hall-Héroult aluminum reduction cells. Another is new and related to the interactions of current perturbations with the azimuthal magnetic field induced by the base current.

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