

Seeing inside a Liquid Metal Battery

Brice Chung, Huayi Yin & Donald R. Sadoway

Department of Materials Science & Engineering
Massachusetts Institute of Technology
77 Massachusetts Avenue, Room 4-211,
Cambridge, MA 02139, U.S.A.

Large-scale energy storage will play an essential role in enhancing the reliability and security of tomorrow's electrical grid, including the integration of intermittent renewable sources. Based on low cost liquid electrodes and electrolytes, Liquid Metal Batteries (LMBs) constitute prime candidates to satisfy the demanding low-cost and long-lifespan requirements of grid-scale applications [1, 2, 3].

Due to their unique reliance on liquid electrodes and liquid/liquid interfaces (Fig.1), LMBs offer the combined benefit of a potentially long lifetime and high rate-tolerant grid-scale energy storage solution. This unique attribute could enable LMBs to excel in a variety of stationary applications ranging from frequency regulation to load leveling. In previous work [1, 2, 3, 4], we demonstrated the exciting capabilities of LMB. In this paper, we present a visual investigation of a LMB during operation. We will show the interface of a liquid metal electrode during electrochemical testing.

By taking advantage of the transparency of the molten salts electrolyte, we can directly observe the behavior of a liquid electrode during electrochemical testing. This dedicated experimental setup led to visually investigate the opportunities and limits of liquid metal electrodes.

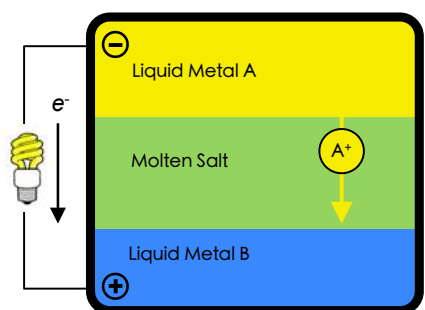


Fig 1. Liquid Metal Battery conceptual schematics

References

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