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FLUID MECHANICS OF LIQUID METAL BATTERIES 600

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ABSTRACT

Liquid metal batteries (LMBs) are promising candidates for economic grid-scale energy storage, a key ingredient of future energy systems relying on volatile renewable sources as wind and solar power [1]. Based on a stable stratification of two liquid metal layers separated by a molten salt, LMBs feature a number of attractive properties: huge current densities, simple construction, easy scalability on the cell level, and potentially near infinity cycle life. However, to realize their full potential, challenging problems in high-temperature electrochemistry, materials science, and metallurgy have to be addressed. Fluid mechanics possesses an overarching significance in the study of this battery type due to the completely liquid interior of those cells.

Recently, different fluid flow phenomena in LMBs were discussed by a number of researchers (see [2] for a review). Interest in this topic is growing. The proposed minisymposium aims to support the trend, to offer a platform for discussion, and to facilitate future collaborations. While the focus shall be on fluid dynamics, lectures on other aspects of LMBs and related devices (e.g., aluminum reduction cells) will be equally welcome and considered to be in the scope of the minisymposium. Topics to be addressed include: mixing and mass transfer, natural convection, magnetohydrodynamic instabilities, electro-vortex flows, electrochemistry of LMBs, scale-up, and grid integration as well as stack design and heat

REFERENCES

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