Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Interfacial Tension Hysteresis in Oxidizing Eutectic Gallium-Indium KEITH D. HILLAIRE, MINYUNG SONG, North Carolina State University, WILLIAM LLANOS, Chicago State University, ABOLFAZL KIANI, SAHAR RASHIDNADIMI, MICHAEL D. DICKEY, KAREN E, DANIELS, North Carolina State University — Eutectic gallium-indium (EGaIn), a room-temperature liquid metal alloy, has the largest interfacial tension of any liquid at room temperature. Under an applied voltage in an electrolytic bath, the anodization of the EGaIn lowers its interfacial tension by orders of magnitude. We observe that the interfacial tension depends not only on the applied potential and the concentration of the sodium hydroxide bath, but also exhibits history-dependence when subjected to voltage sweeps. We examine the origins of these effects as arising from the dissolution rate of the oxide and the reaction rate (measured via current density). We identify four distinct regimes in the interfacial tension's dependence on electric potential, arising from the formation of different oxide species and configurations, and present a model that describes the voltage-dependence of the interfacial tension.

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Date submitted: 10 Aug 2020 Electronic form version 1.4