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Self-Organized Porous Nanostructures in Anodized Metal Oxide LIAM STANTON, ALEXANDER GOLOVIN, Northwestern University — We consider the self-organization of porous nanostructures in anodized metal oxide. We have developed a mathematical model which incorporates the electro-chemical transport of oxygen anions within the oxide layer and the chemical reactions at the metal-oxide and oxide-electrolyte interfaces. It is shown through linear stability analysis, that a short-wave instability exists in certain parameter regimes which leads to the formation of hexagonally ordered pores observed in anodized aluminum oxide. Numerical simulations validate these results.

Liam Stanton
Northwestern University

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