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Fabrication and Characterization of Metal-Patterned $SrCo_{0.9}Nb_{0.1}O_{3-\delta}$ Thin Film Cathodes with Well-defined Geometry IWNETIM ABATE, Minnesota State University Moorhead, WOOCHUL JUNG, Korea Advanced Institute of Science & Technology, SOSSINA HAILE, California Institute of Techonology — A major obstacle to the study of fundamental properties of candidate cathode materials is the morphological complexity of the electrode-electrolyte interface in fuel cells. This complexity prevents a true determination of the catalytic mechanisms. To address this challenge, photolithography patterning technique has been used to make considerably simplified and well-defined electrode geometries. However, the time required for such fabrication is extreme. In this work, we employ a simple shadow-mask-patterning method to fabricate a perovskite oxide-metal composite structure. First, a dense thin film of $SrCo_{0.9}Nb_{0.1}O_3$(SCN) is grown on a $Y_{0.16}Zr_{0.84}O_{1.92}$ (YSZ) single crystal substrate by pulsed laser deposition. Patterned metal layers are subsequently deposited by DC sputtering with a shadow mask. Thermal stability and electrochemical properties of the fabricated composite cathodes are investigated by optical microscopy, scanning electron microscopy and AC impedance spectroscopy (ACIS).

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