Short Communication

Fabrication of Pyrite FeS₂ Films from Electrochemically Deposited FeOOH by Sulfur Annealing

Sayaka Maki, Nobuaki Takeda, Masaya Ichimura^{*}

Department of Electrical and Mechanical Engineering, Nagoya Institute of Technology, Nagoya 466-8555, Japan

^{*}E-mail: ichimura.masaya@nitech.ac.jp

doi: 10.20964/2018.11.55

Received: 29 June 2018 / *Accepted:* 7 August 2018 / *Published:* 1 October 2018

Pyrite (FeS₂) thin films were fabricated via the sulfurization of electrochemically deposited γ -FeOOH. FeOOH thin films were deposited from an aqueous solution containing 50 mM FeSO₄ and 100 mM Na₂SO₄. The FeOOH precursor films and sulfur powder were placed in an alumina case with a lid, and annealed in N₂ at 400°C, 450°C, and 500°C for 30 min. For comparison, electrochemically deposited Fe–S–O films were also sulfurized under the same conditions. According to the Raman results, nearly phase-pure pyrite was obtained from the FeOOH precursor films, whereas a significant amount of marcasite phase was found in the films fabricated from the Fe–S–O precursor. Thus, phase-purity was greatly improved by adopting FeOOH as the precursor for pyrite.

Keywords: FeS₂, pyrite, electrochemical deposition, FeOOH, sulfurization

[FULL TEXT](#)

© 2018 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).