

[Available Issues](#) | [Japanese](#)>> [Publisher Site](#)Author:  [ADVANCED](#) | Volume  Page   
Keyword:     [TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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[\[PDF \(954K\)\]](#) [\[References\]](#)**Sensor Properties and Surface Characterization of Silver-deposited SPR Optical Fibers**[Masaru MITSUSHIO<sup>1\)</sup>](#), [Yasuyuki ABE<sup>2\)</sup>](#) and [Morihide HIGO<sup>1\)</sup>](#)*1) Department of Chemistry, Biotechnology, and Chemical Engineering, Graduate School of Science and Engineering, Kagoshima University**2) Department of Applied Chemistry and Chemical Engineering, Graduate School of Science and Engineering, Kagoshima University***(Received May 21, 2010)****(Accepted July 24, 2010)**

The response curves and sensor properties of silver-deposited optical fibers with Ag film thicknesses of 20.0 – 80.0 nm based on surface plasmon resonance (SPR) were investigated. The response of the Ag-deposited optical fiber sensor depends on the thickness of the Ag film. The Ag-deposited optical fiber sensors show higher responses than those deposited with Au. The reflection properties of Ag films with thicknesses of 30.5 – 70.2 nm due to the SPR phenomenon were also measured and considered. The surfaces of these Ag films consist of various spherical grains with diameters of 30 – 90 nm and the surface height distribution is almost random, having a value of more than 8 nm. X-ray photoelectron spectroscopy (XPS) showed the presence of very thin (0.3 nm) native oxide layers on the Ag films. The Ag-deposited optical fiber sensor exhibited no change in the sensor properties following prolonged use for 4 months. The response curves of the Ag-deposited optical fiber sensors by use of SPR theoretical equations were calculated and compared with those obtained by experimentation.

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