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Abstract
In this study, porous conductive films were grown on glass substrates, metal substrates and nickel bowl-like array substrates by using glancing angle deposition (GLAD) of aluminum (Al), copper (Cu) and titanium (Ti). Surface morphology and structure of porous thin films were analyzed by FE-SEM and XRD, and the porosity was characterized by both reflectance and photocurrent of atomic-layer-deposited TiO2 films.

The results show that the porous Al, Cu and Ti films can be prepared by GLAD, and the porosity of Al was the best of all. The porosity was found to be independent of deposition rate for films grown on substrates without rotating. As rotating the substrate, the porosity increases with increasing the deposition rate for Al films, but almost unchanged for Ti and Cu films. The porosity is independent of the rotation speed for all samples. The Ti and Cu films with low porosity can be further improved by using the nickel bowl-like arrays as the substrates. It was found that increasing the porosity improves the light trapping ability and enhance the photocurrent of coated TiO2 films.
Keyword：glancing angle deposition、porous conductive substrates、photocurrent
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