

Graphitic Carbon Film Formation under Ni Templates by Radiofrequency Sputtering for Transparent Electrode Applications

Meng-Yu Lin, Yung-Shuan Sheng, Shu-Han Chen, Ching-Yuan Su, Lain-Jong Li and Shih-Yen Lin*

Research Center for Applied Sciences, Academia Sinica

J. Vacuum Sci. Tech. B 2011, 29, 061202

An alternate approach to the preparation of transfer-free graphitic carbon films is proposed in this paper. Using a standard radio-frequency sputtering system and a high-temperature annealing procedure, graphitic carbon films are prepared under Ni templates. The results demonstrate that carbon precipitation occurs at both Ni template interfaces. With repeated annealing procedures at 1100 °C, a sheet resistance of $1.36 \times 10^4 \Omega/\square$ can be achieved. Selective carbon film deposition has also been developed via pattern formation on the Ni templates. The results indicate the potential application of this method to transparent electrode formation.

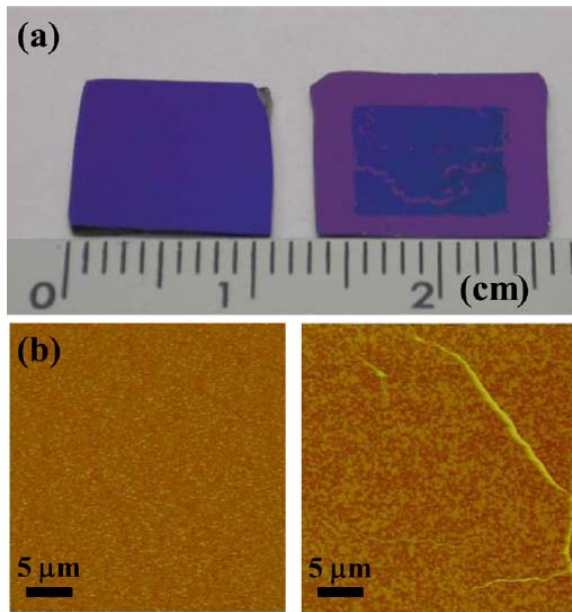


FIG. 1. (Color online) (a) Pictures and (b) $30 \times 30 \mu\text{m}^2$ AFM images of the carbon films below (left) and above (right) the Ni template, obtained from a sample with annealing temperature of 1100 °C.

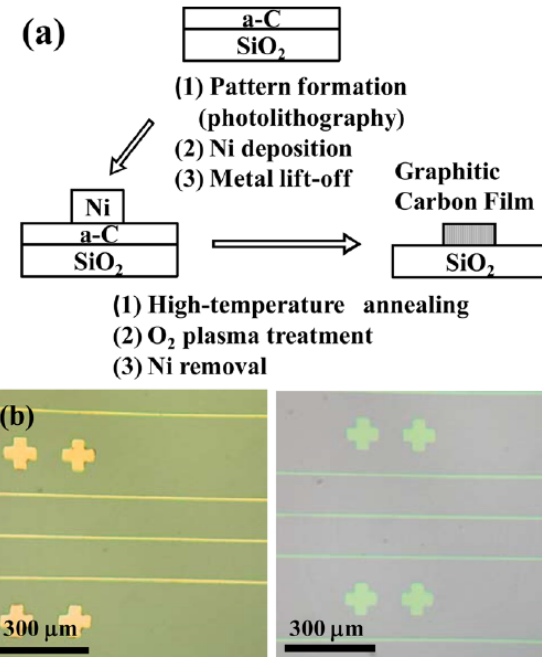


FIG. 4. (Color online) (a) Fabrication procedure for selective carbon film deposition, and (b) pictures of the sample before (left) and after (right) Ni removal taken by optical microscopy.