

Preparation of CuO nanosheet array thin film with controlled morphology for SERS and photocatalysis

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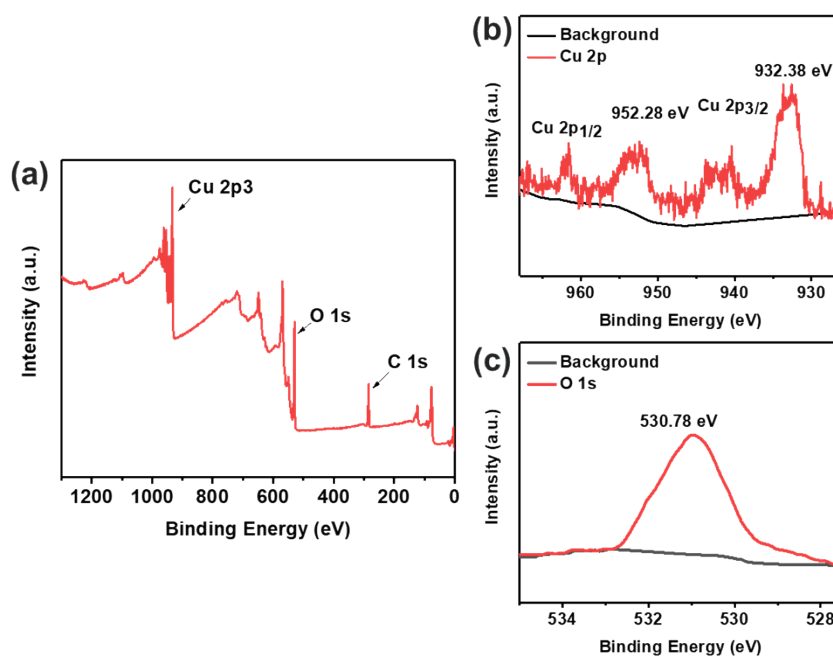


Fig. S1 (a) XPS spectrum of 0.5-10CuO substrate. (b) High resolution XPS spectrum of Cu 2P. (c) High resolution XPS spectrum of O 1S.

The elemental composition and chemical states of CuO substrate were characterized by X-ray photoelectron (XPS) spectroscopy. 0.5-10CuO substrate was selected as a typical substrate, and the full XPS spectrum was shown in Fig. S1(a). The analysis showed the existence of Cu 2P and O1s orbitals. Further, the high-resolution Cu 2P XPS spectrum is shown in Fig. S1(b). There are two satellite peaks at 932.38 eV and 952.28 eV, corresponding to the Cu 2p_{3/2} and Cu 2p_{1/2} orbits, respectively. The difference between these two energy levels is about 20 eV, which verifies the phase of CuO.¹ Then, Fig. S1(c) shows the 1S orbital of O with a bond energy of about 530.78 eV. This, together with the previous XRD patterns, confirmed that the material obtained by electrochemical anodic oxidation was undoubtedly copper oxide.

1 A. Balcytis, M. Ryu, G. Seniutinas, J. Juodkazyte, B. C. Cowie, P. R. Stoddart, M. Zamengo, J. Morikawa and S. Juodkazis, *Nanoscale*, 2015, **7**, 18299-18304.