Supporting Information

Mesoporous NiO@ZnO Nanofiber Membranes via Single-nozzle Electrospinning for Urine Metabolism Analysis of Smokers

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To investigate the effect of smoking on metabolites in urine samples, we selected smoking subjects between the ages of 23 and 65, and most of them smoked a pack of cigarette a day. Only two young smokers who were 23 years old smoked half a pack of cigarettes a day. All of the smokers and nonsmokers were male, and they were asked not to drink alcohol for one week during the experiments. Each smoker was given two packs of Chunghwa cigarettes of the same size, and the urine samples were obtained on the third morning after two consecutive days of smoking.
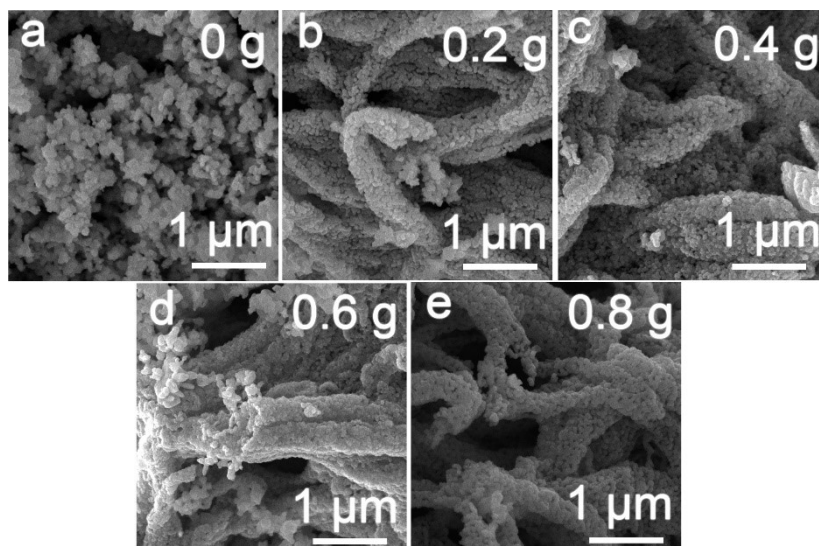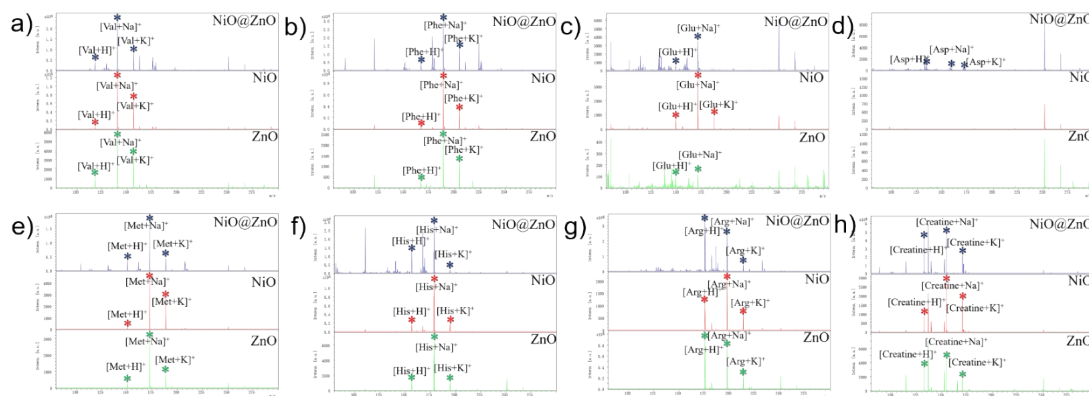
Fig. S1. SEM images of the mesoporous NiO@ZnO nanofiber membrances synthesized with different additions of the PS spheres: (a) 0 g; (b) 0.2 g; (c) 0.4 g; (d) 0.6 g; (e) 0.8 g.
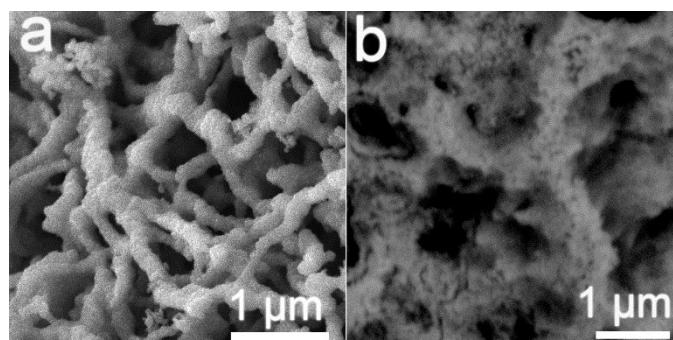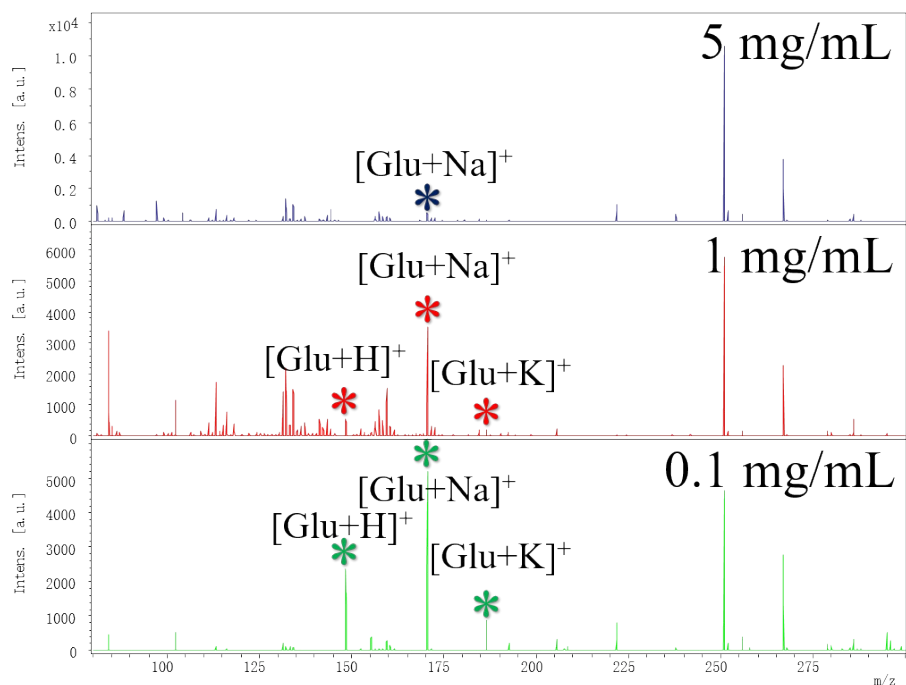

**Fig. S2**. SEM images of the NiO (a) and ZnO (b) nanofibers.
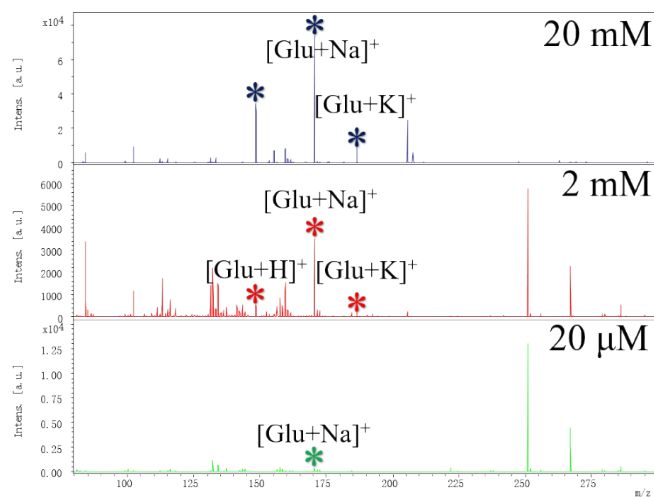
Fig. S3. The MS spectra of Glu with different concentrations based on mesoporous NiO@ZnO nanofiber membrances as matrix.

Fig. S4. Analysis of metabolic model analytes based LDI-MS. The MS spectra of NiO@ZnO, NiO and ZnO as matrices separately for a) Val, b) Phe, c) Glu, d) Asp, e) Met, f) His, g) Arg and h) Creatine.

Fig. S5. The MS spectra of Glu based on mesoporous NiO@ZnO nanofiber membrances with different concentrations as matrix.
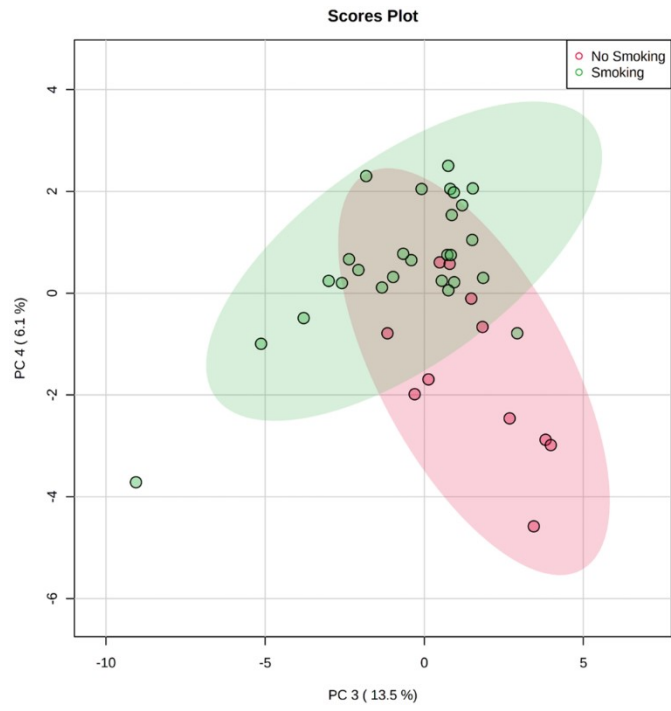
Fig. S6. The PCA results of smokers and nonsmokers.