# Electronic Supplementary Information (ESI) *for*

The volatile release evaluation of nicotine of snus products under different storage conditions based on surface-enhanced Raman spectroscopy technology

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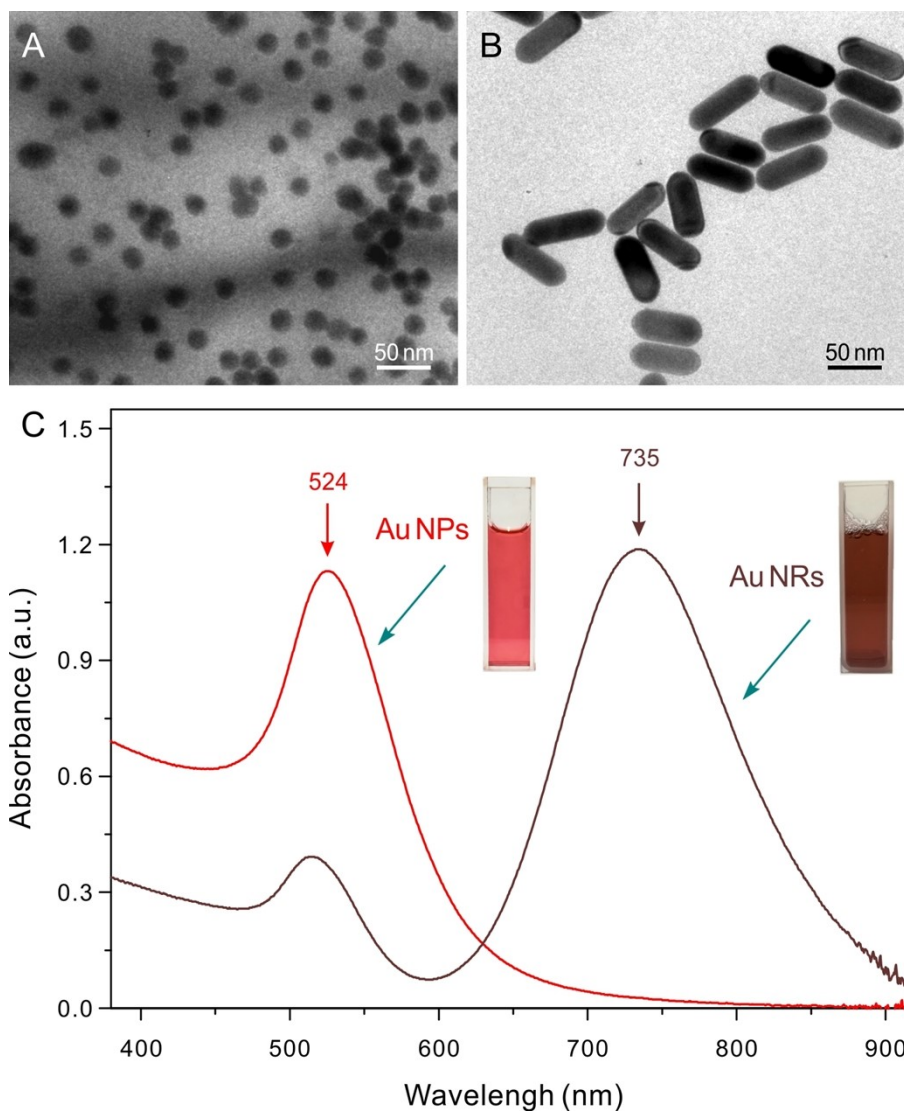
Fig.S1 (A) Typical TEM image of Au NPs. Most NPs size were about 18~22 nm. (B) Typical TEM image of Au NRs. The AuNRs were 75±5 nm long and 25 ± 3 nm in diameter. (C) UV–vis absorption spectra of AuNRs and AuNPs.
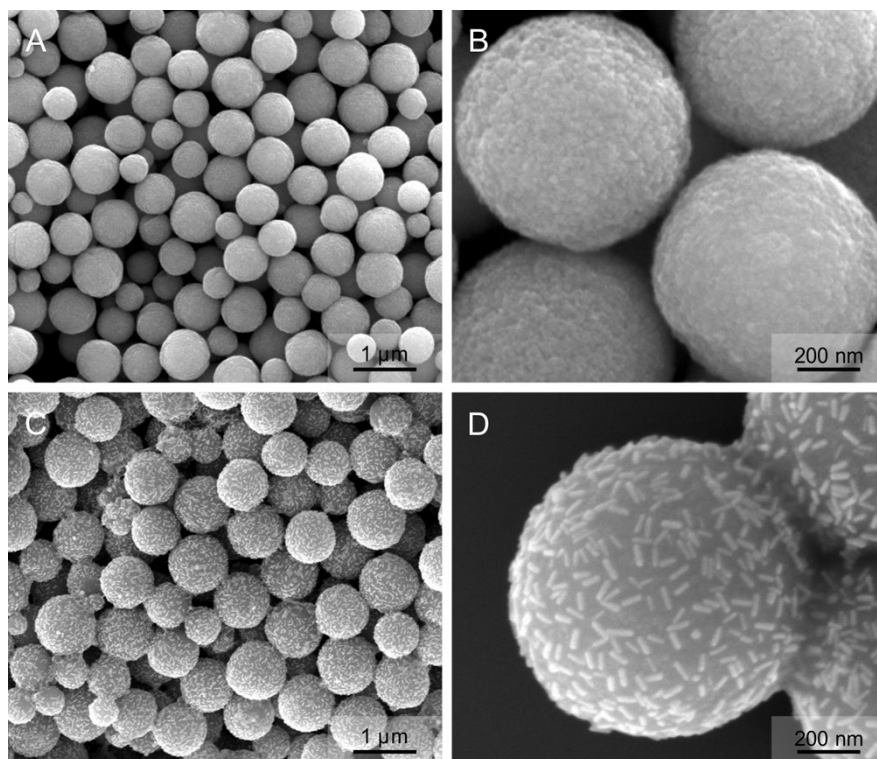
Fig.S2 Typical SEM images of (A) and (B) Fe_3O_4 microparticles correspond to different magnifications. The sample was composed of many dispersed spherical particles with diameters of 500~800 nm. Typical SEM images of (C) and (D) Fe_3O_4@NR microparticles correspond to different magnifications. The TEM images indicated that the Fe_3O_4 microparticles were coated with AuNRs.
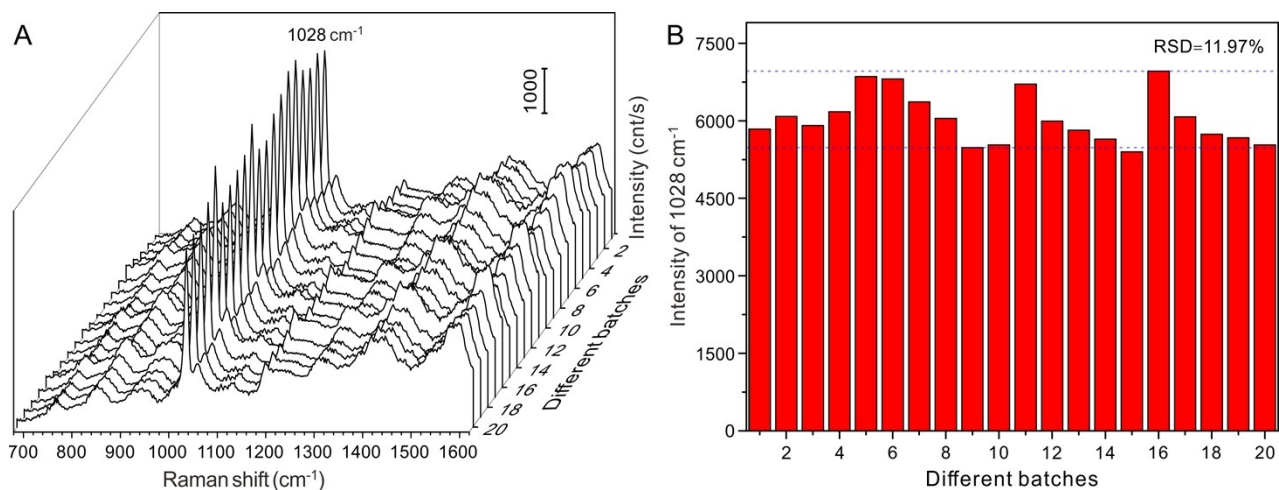
Fig.S3 (A) The Raman peak at 1028 cm^{-1} was chosen to calculate the relative standard deviation (RSD) of different spectra to evaluate the reproducibility of Fe_3O_4@AuNRsNPs. (B) The value of RSD in different batches from Fe_3O_4@AuNRsNPs is 11.97%.
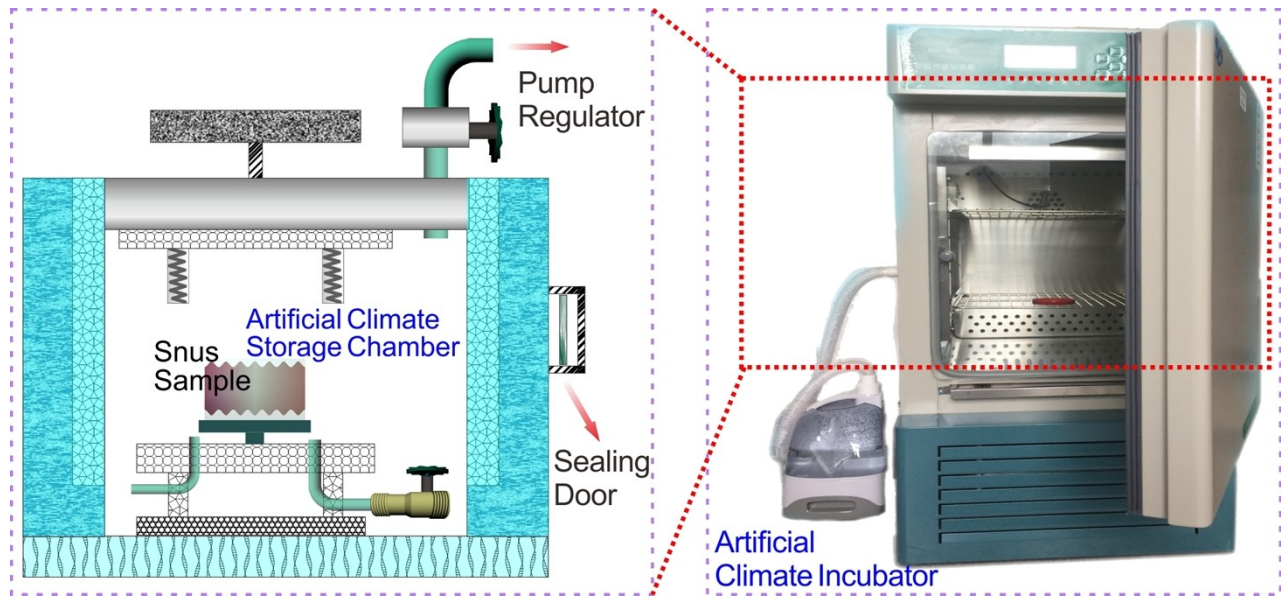
Fig.S4 Schematic illustration of different storage conditions based on the artificial climate storage chamber and typical digital photos of artificial climate incubator. By setting the temperature, humidity and other conditions of the artificial climate storage chamber, put the snus pouch into the storage chamber for a certain period of time, respectively, and then transfer it into the air extraction chamber. The volatile components on the surface of the snus products will follow the air flow, and the water-soluble molecules such as nicotine would remain in the water filter module (similar to a water pipe). After the micro pump worked for 10 min, the SERS detection module was connected, and the liquid in the water filter would be entered into the capillary, which loaded with Fe_3O_4@AuNRsNPs microparticles. After staying for 5min, SERS detection could be carried out, and the Raman spectrum collection time was about 5 s.