Supporting information for:

Detection of nerve gases using surface-enhanced Raman scattering substrates with high droplet adhesison

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Methods

Nanofabrication

The gold-coated silicon nanopillar SERS substrates were fabricated using a three-step process. In brief, maskless silicon reactive ion etching is utilized to form vertically free standing silicon (Si) pillars with r ≈ 20 nm in pillars/µm^2). Next, the Si nanopillar surface is treated by an O_2-plasma, and finally, a 200 nm thick gold film is deposited using e-beam evaporation process. Forming nanopillars with dimensions according to the cartoon below.

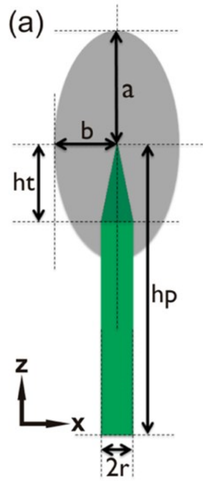

Fig. S1 Pillar dimensions are: a ≈ 155 nm, b ≈ 62 nm, r ≈ 20 nm, hp ≈ 400 nm, ht ≈ 100 nm.

Raman measurements

A portable Raman instrument, First Defender RMX (Thermo Fisher Scientific Inc, Fig. 2a), was used with a fixed integration time of 10 s and medium output power (measured to 88 mW) for the 785 nm diode laser beam focused on the SERS sample via the flexible optical cable and a lens mounted on an aluminium plate with a working distance of 5 mm. The laser spot diameter on the SERS substrates was approximately 150 µm and the spectral resolution was about 10 cm^{-1} according to the manufacturer.

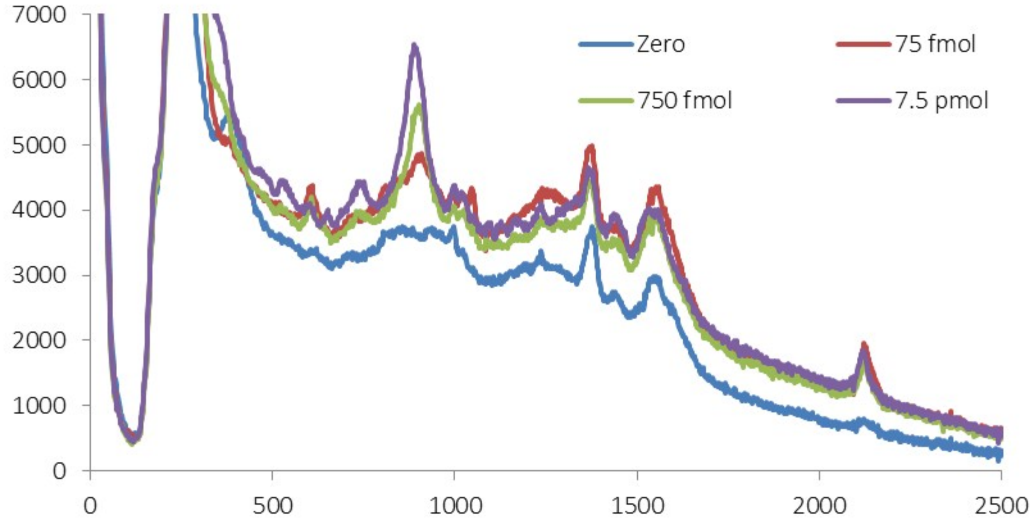

Fig. S2 Concentration dependence of VX.

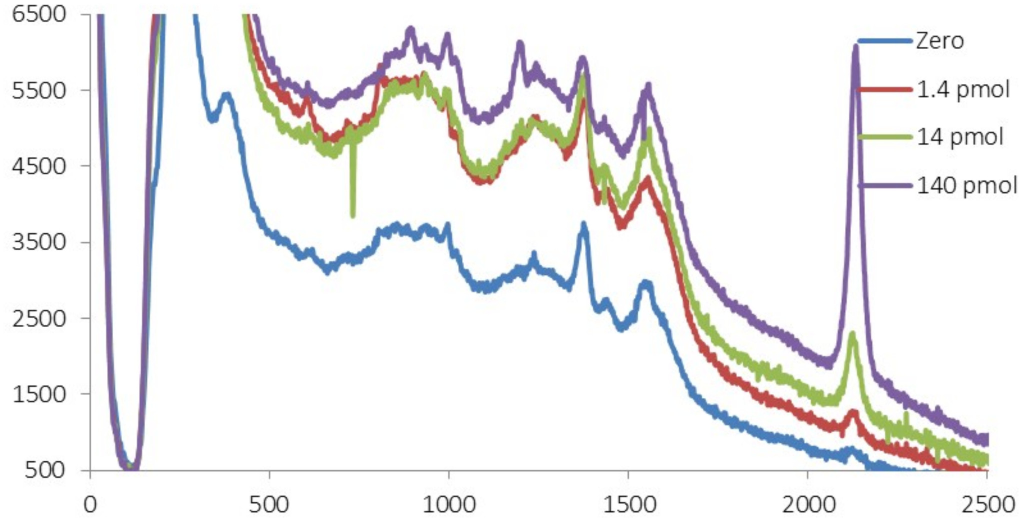

Fig. S3 Concentration dependence of Tabun.