

Direct and quantitative detection of dicyandiamide (DCD) in milk using surface enhanced Raman spectroscopy

Xiang Lin,^a Wu-Li-Ji Hasi,^{*a} Xiu-Tao Lou,^a Siqingaowa Han,^b Dian-Yang Lin,^{*a} Zhi-Wei Lu^{*a}

^a *National Key Laboratory of Science and Technology on Tunable Laser, Harbin Institute of Technology Harbin150080, China;*

^b *Affiliated Hospital of Inner Mongolia University for the Nationalities, Inner Mongolia Tongliao 028007, China)*

Supplementary Information

In order to determine the enhancement factor (EF) of silver colloid for detecting DCD in water, normal Raman spectrum of 4×10^{-2} g/mL DCD aqueous solution and SERS spectrum of 5×10^{-6} g/mL DCD aqueous solution under alkaline condition were recorded respectively (Fig. S2). It's worth noting that the actual concentration of DCD in solution subjected SERS measurement is 4×10^{-6} g/mL due to the dilution by silver colloid and aggregate agents. The enhancement factor of silver colloid was calculated according to the following equation:

$$EF = \frac{I_{SERS}}{I_{NR}} \times \frac{C_{NR}}{C_{SERS}} \quad (1)$$

I_{SERS} is the intensity of the selected band at 926 cm^{-1} obtained by SERS, I_{NR} is the corresponding band intensity of the normal Raman spectrum. C_{SERS} and C_{NR} are the sample concentrations in the SERS and normal Raman measurements, respectively. Based on the characteristic peaks at around 926 cm^{-1} , according to Eq. (1), an approximately 2.88×10^5 fold of signal enhancement in the SERS spectrum was achieved.

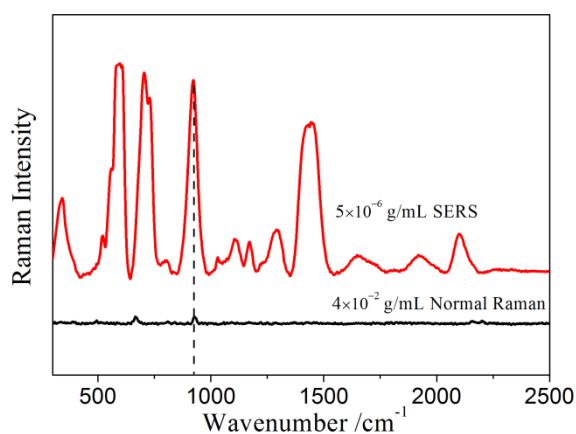


Figure S1. SERS spectrum of 5×10^{-6} g/mL DCD in water under alkaline condition (top red line) and normal Raman spectrum of 4×10^{-2} g/mL DCD in water (bottom black line). (Offset for clarity, same scale).

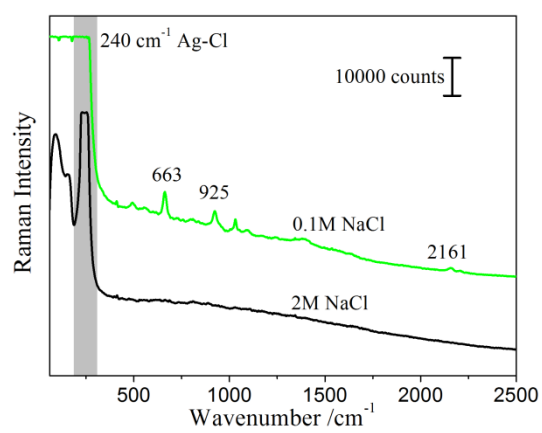


Figure S2. SERS spectra of DCD solution using NaCl as aggregating agent with different concentrations (0.1M and 2M).