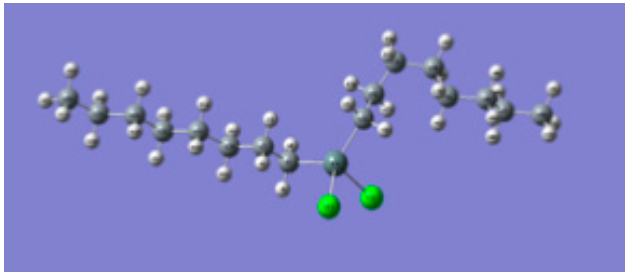
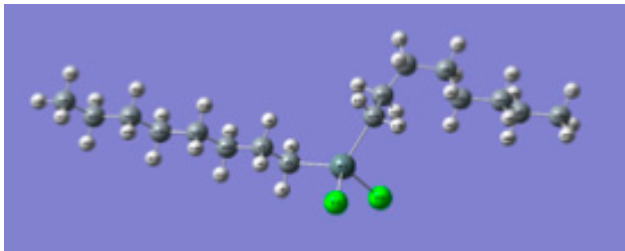
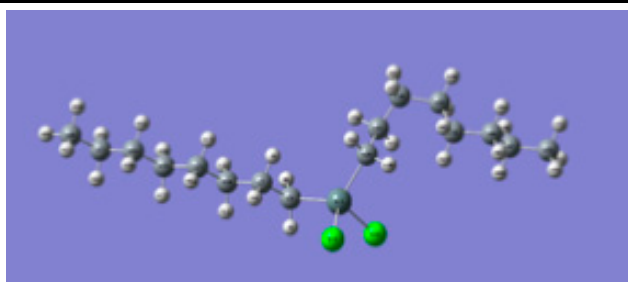


**Rapid and Ultrasensitive Detection of Dioctyltin in Textiles Using
Surface-Enhanced Raman Spectroscopy (SERS): Mechanistic
Insights and Practical Applications**

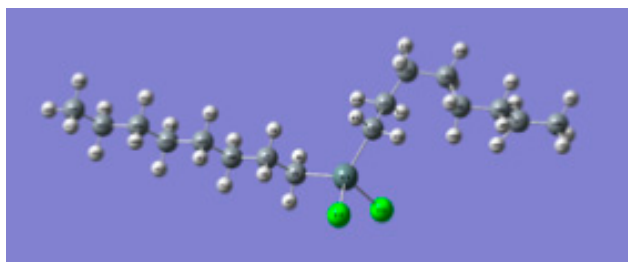
Supplementary Materials

Table S1 Table of corresponding vibration motion diagram of DOCT's Raman characteristic peak

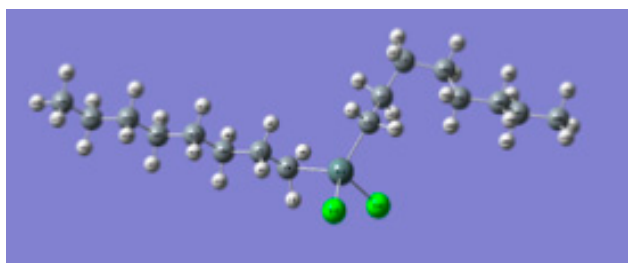
Vibrational modes of functional groups	Raman shift (cm ⁻¹)	Corresponding vibrational mode
	332	Sn-Cl, Telescopic vibration
	580	Sn-C, Telescopic vibration



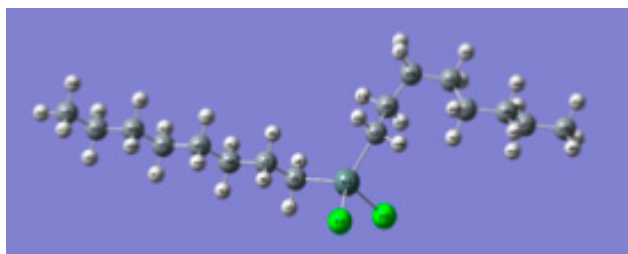
988 C-C of octyl
group,
Telescopic
vibration



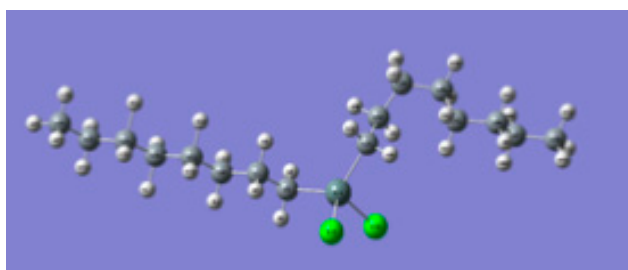
1188 C-H,
bending vibration



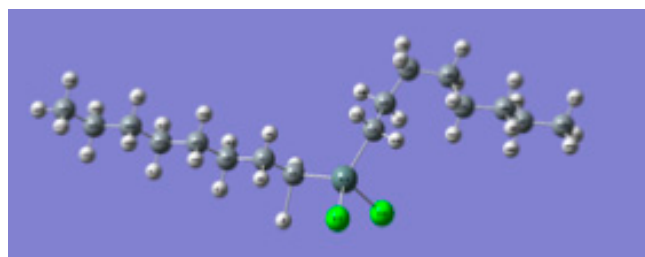
1332



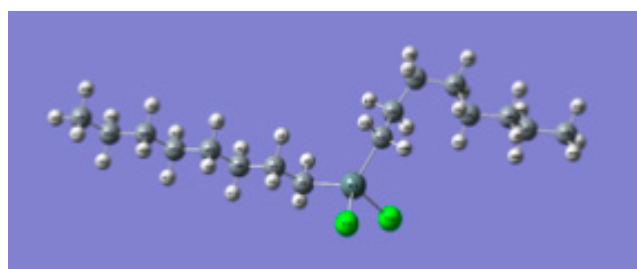
1484



2996 C-H,
Telescopic
vibration



3084



3108

Table S2. DOCT Raman characteristic peaks and their corresponding vibrational modes

Raman shift (cm ⁻¹)	Corresponding vibrational mode
301	Sn-Cl, stretching vibration
600	Sn-C, stretching vibration
970	C-C of octyl group, stretching vibration
1152	C-H, bending vibration
1297	
1436	
2847	C-H, stretching vibration
2881	
2918	

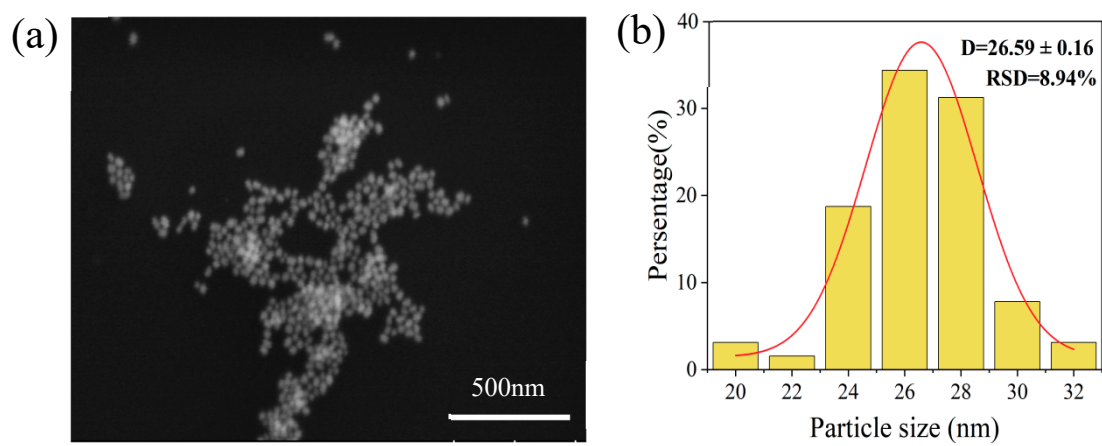


Fig. S1 (a) SEM image of Au NPs (b) Particle size distribution of Au NPs

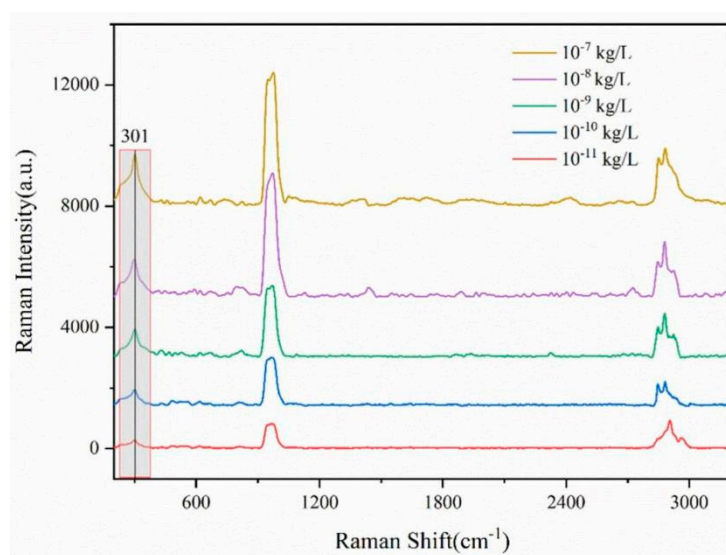


Fig. S2 DOCT standard solution gradient concentration SERS profile

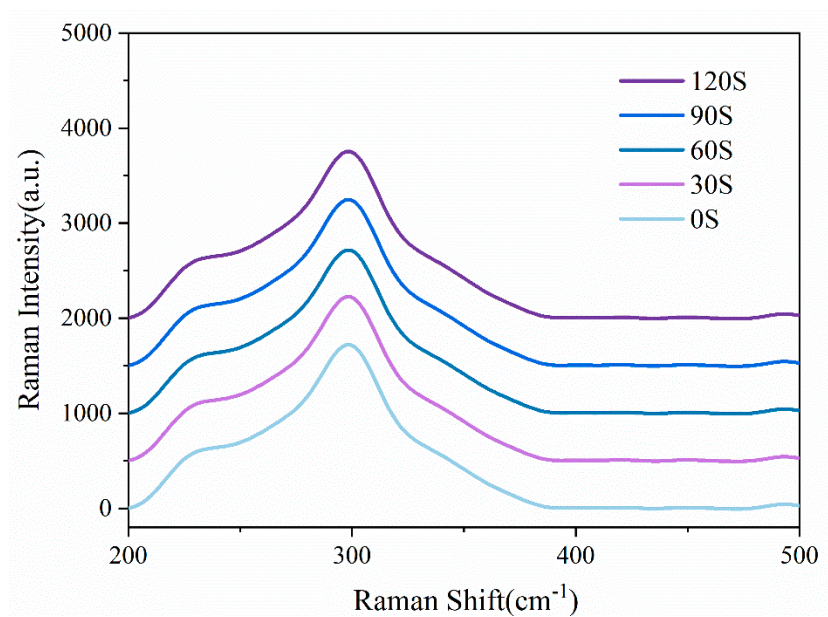


Fig. S3 Time-dependent SERS spectra of DOCT recorded under 532 nm laser (1% power, ≈ 1 mW) for consecutive scans. The SERS spectra are displayed with a vertical offset of 500 counts for different time to avoid overlap and facilitate observation.

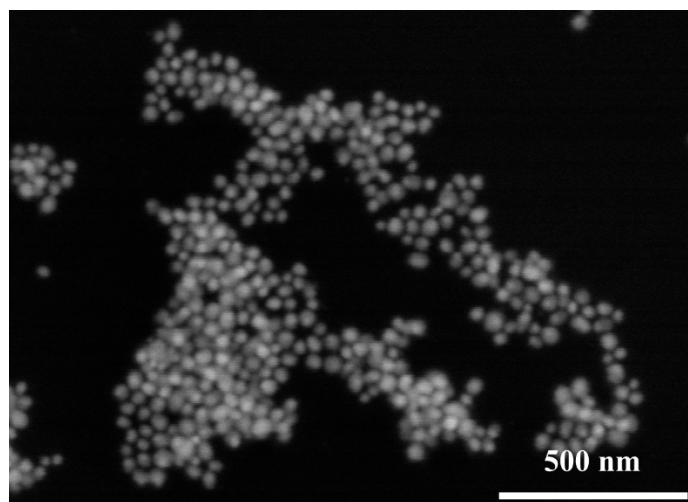


Fig. S4 Representative SEM image of the Au@Ag NPs assembled on the silicon substrate

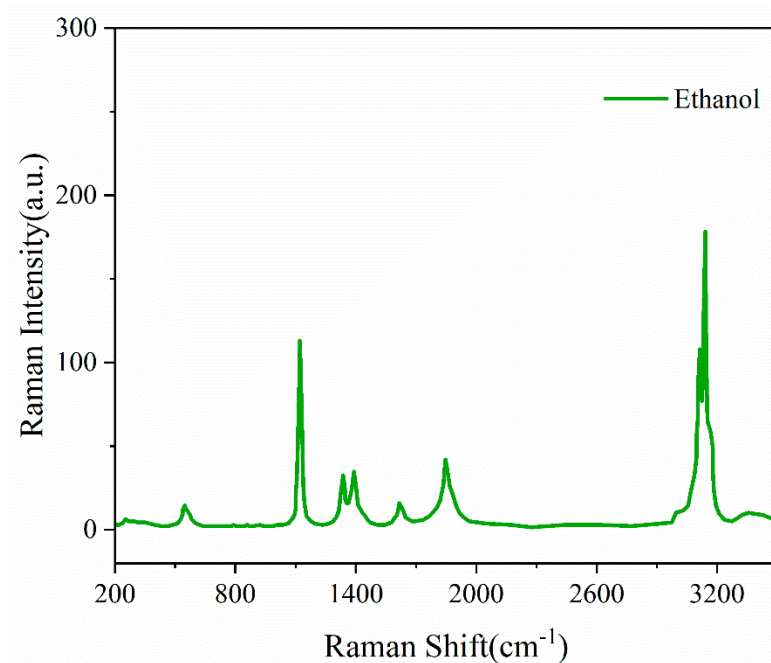


Fig. S5 SERS spectrum of ethanol solvent

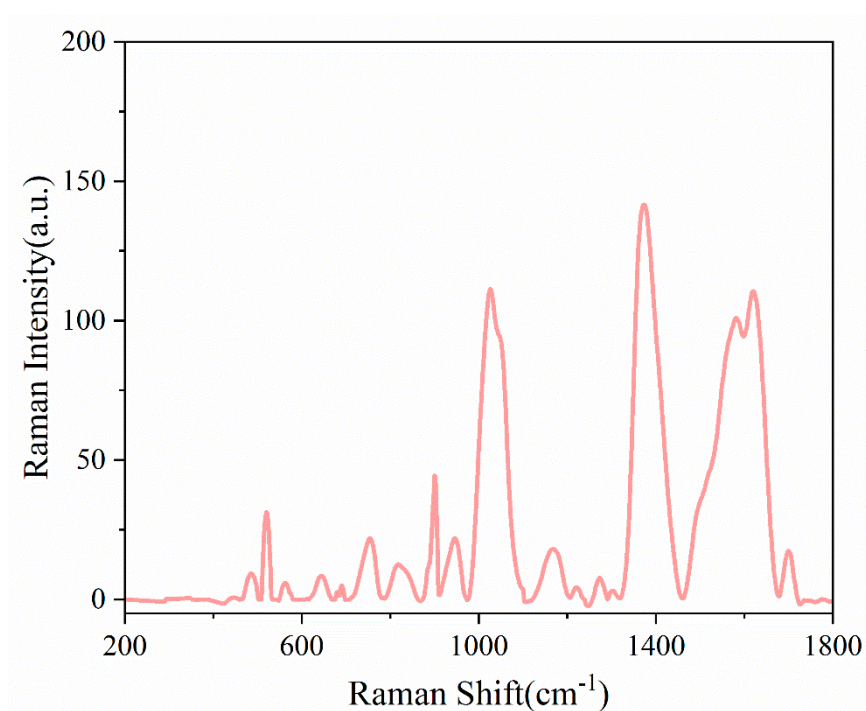


Fig. S6 SERS spectrum of the extract from blank polyester textile

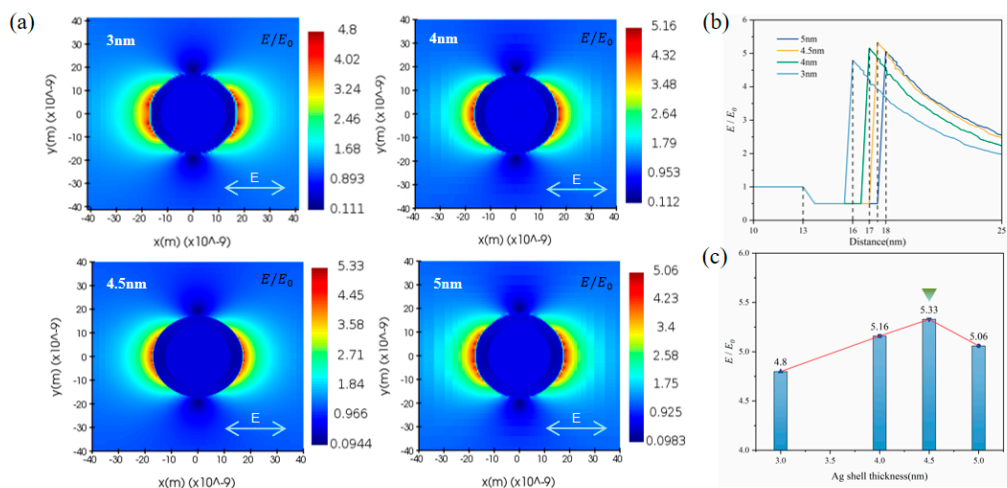


Fig. S7 (a) Simulated electric field distribution of Au@Ag NPs with different Ag shell thicknesses (b) Comparison of electric field intensity along the diameter in the cross-section of Au@Ag NPs with different Ag shell thicknesses (c) Comparison of the maximum electric field enhancement factor on the surface of Au@Ag NPs with different Ag shell thicknesses