Supplementary Information

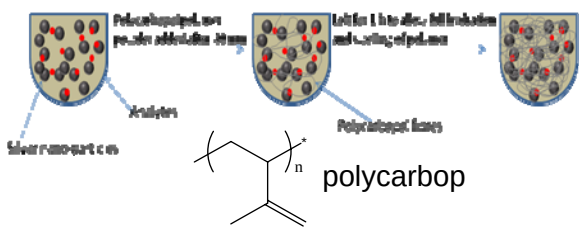

Fig. S1: A schematic diagram of SEROA sample preparation with use of the polycarbopol polymer.

Colloid Preparation

Citrate-reduced silver colloids were prepared by reduction of silver nitrate with citrate ions (*Lee and Meisel method*),[21] where 0.094 g of $AgNO_3$ was dissolved in 500 ml of distilled H_2O and heated to boiling point, then 10 ml of 1% trisodium citrate solution was added drop wise to the mixture. Heating was continued for another hour with constant stirring and then the solution was allowed to cool to room temperature. Approximately 300 ml of a green-grey solution was obtained at ~0.5 M concentration. All glassware used to prepare the colloids was washed prior to use with *aqua regia* followed by gentle scrubbing with a 2% Helmanex solution and thorough rising with distilled water.

Sample Preparation for Raman and ROA Measurements

Samples of D- and L-ribose for Raman and ROA spectra were prepared by dissolving into distilled water at 100 mg/ml, then were microcentrifuged for 5 minutes at 3000 rpm to minimize dust particles prior to loading into quartz microflourescence cells.

Atomic Force Microscopy

Micrographs were obtained using a Veeco Picoforce Multimode AFM with standard extender module, Nanoscope IIIA controller and a Picoforce scanner. Each AFM plate was prepared by adding 50 µl of sample to freshly cleaved mica and left at room temperature for 30 minutes. The mica was then rinsed carefully under distilled water for approximately 10 seconds and dried under a gentle stream of nitrogen. AFM was carried out in air in tapping mode with a scan size of 5 microns and a scan rate of 0.5 Hz using a Silicon 'TAP300' AFM cantilever and tip (oscillated at approximately 260 kHz). Fig. S2 presents AFM images of silver citrate reduced colloids before and after addition of polycarbopol polymer. The micrograph of polycarbopol without metal colloids (fig. S2B) shows a very smooth surface whereas the metal colloids give rise to a very rough surface (fig. S2A). Addition of polymer to metal colloids does not induce significant change to morphologies of the metal particles that are observed in fig. S2C and confirms that aggregation is significantly reduced.

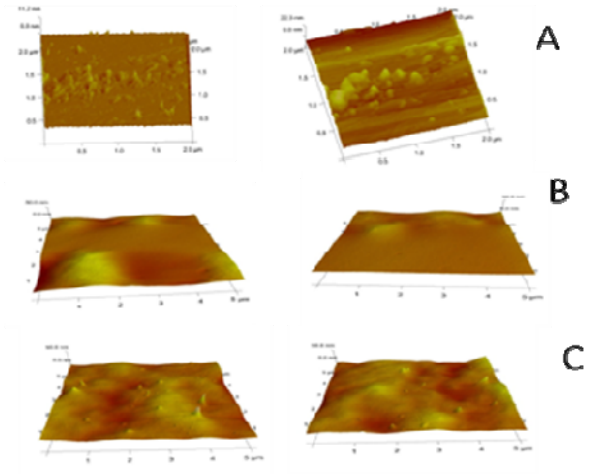

Fig. S2: Dual views of AFM images of silver citrate reduced colloids only (A), polycarbopol polymer only (B) and a mixture of silver citrate reduced colloids and polycarbopol polymer (C). We thank Dr. Steven Marsden at the Manchester Interdisciplinary Biocentre, University of Manchester for help with collecting the AFM images.

Random regions of different micrographs were selected and the diameters of nanoparticles contained within were measured by using the measuring tool in the Nanoscope 7.2 software. The average particle sizes of silver colloids with and without polycarbopol polymer were ~67 and 70 nm, respectively, so the particle size in the polymer gel was very similar to that observed for normal silver colloids. However, the individual colloidal particles are much more distinct in the AFM images upon addition of the polymer. This is not an issue as the maximum SERS enhancement was obtained before controlling the aggregation process. The micrographs in combination with the time dependent SERS data (fig. S3), which are discussed below, confirm that the addition of polycarbopol to silver colloid controls the aggregation process of the nanoparticles.

SERS Time Dependence

The time dependence study was performed by measuring the intesities of bands at 1366 and 1409 cm^{-1}. Fig. S3 shows the intensity changes in both normal and polymer-SERS solution over a 35 mins time interval. The intensity in normal SERS experiments decreased significantly after 10 mins. As is shown in fig. S3, the enhancement was kept constant in the polymer-SERS sample for a substantially longer time.

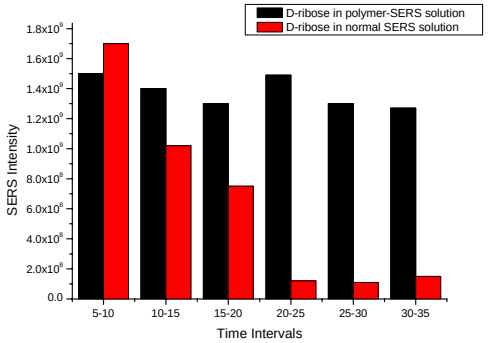

Fig. S3: Time dependence SERS study for D-ribose molecule with and without addition of polymer to SERS solution.

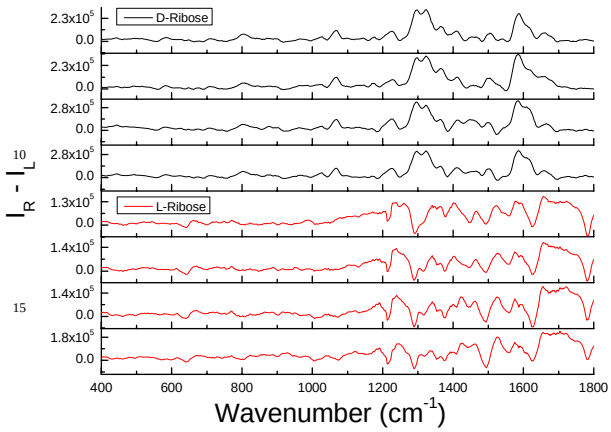

Fig. S4: Example repeats of SEROA spectra for D- (top) and L-ribose (bottom) with the same conditions for each spectrum, where concentration of each sample was 0.25 mg/ml and K_2SO_4 concentration was 0.020 M, with addition of 20 mg/mL of polycarbopol, data collection time of 35 mins.

Table 1: Table 1: Raman and ROA band assignments of L- and D-ribose in aqueous solution

Raman		ROA		
D-ribose (cm^{-1})	**L-ribose (cm^{-1})**	**D-ribose (cm^{-1})**	**L-ribose (cm^{-1})**	**Assignments**
420	420	420 (+ve)	408 (-ve)	δ CCO +δ CCC[23]
467	467	452 (-ve)	455 (+ve)	δ CCO +δ CCC[23]
547	547	550 (+ve)	544 (+ve)	Sym, ring bend[23]
601	601	598 (+ve)	595 (-ve)	δ CCO +δ CCC[23]
652	652	652 (-ve)	652 (+ve)	δ OCO, β anomer[22,23]
682	682	682w (+ve)	682w (+ve)	δ OCO, α anomer[22,24]
729	729	726 (+ve)	732 (+ve)	ν CC, δ CCO +δ CCC[23]
805	805	802 (+ve)	802 (+ve)	ν CC+ ν CO+ δ OH[24]
879	879	877 (+ve)	874 (-ve)	ν CC+ ν CO+ δ OH[24]
919	919	914 (-ve)	914 (+ve)	ν CC+ ν CO[24]
970	970	964 (+ve)	967 (-ve)	ν CC+ ν CO + δ CH[24]
1014	1014	1009 (-ve)	1009 (+ve)	ν CC+ ν CO[24]
-	-	1048 (+ve)	1048 (-ve)	ν CC+ ν CO[24]
1083	1083	1069 (-ve)	1069 (+ve)	ν CC+ ν CO[24]
-	-	1105 (-ve)	1105 (+ve)	ν CC+ ν CO[24]
1127	1127	1135 (+ve)	1135 (-ve)	ν CO[24]
1270	1270	1260 (+ve)	1262 (-ve)	τ CH_2 + δ OH[23]
1327	1327	1363 (-ve)	1363 (+ve)	δ CH+ ω CH_2[23]
1467	1467	1467 (-ve)	1467 (-ve)	δ CH_2[23]
1640	1640	-	-	δ CH_2[23]

**ν = stretching mode, δ = bending, τ = torsion, ω = wagging*