Electronic Supplementary Material (ESI) for Lab on a Chip.

Electronic Supporting Material

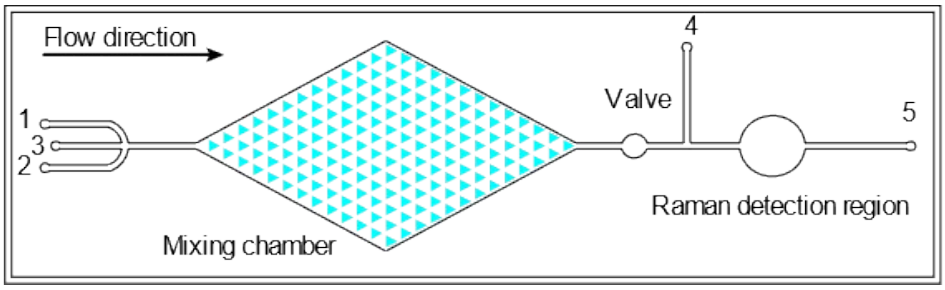

Fig. S1 CAD diagram of the microfluidic Raman chip.

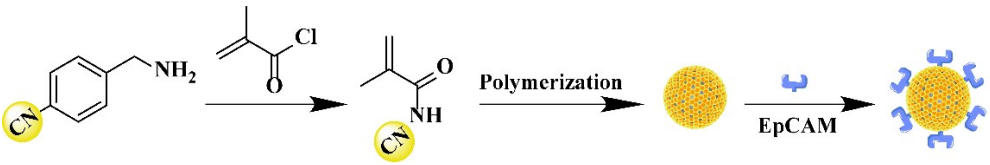

Fig. S2 Process for Raman bead synthesis.

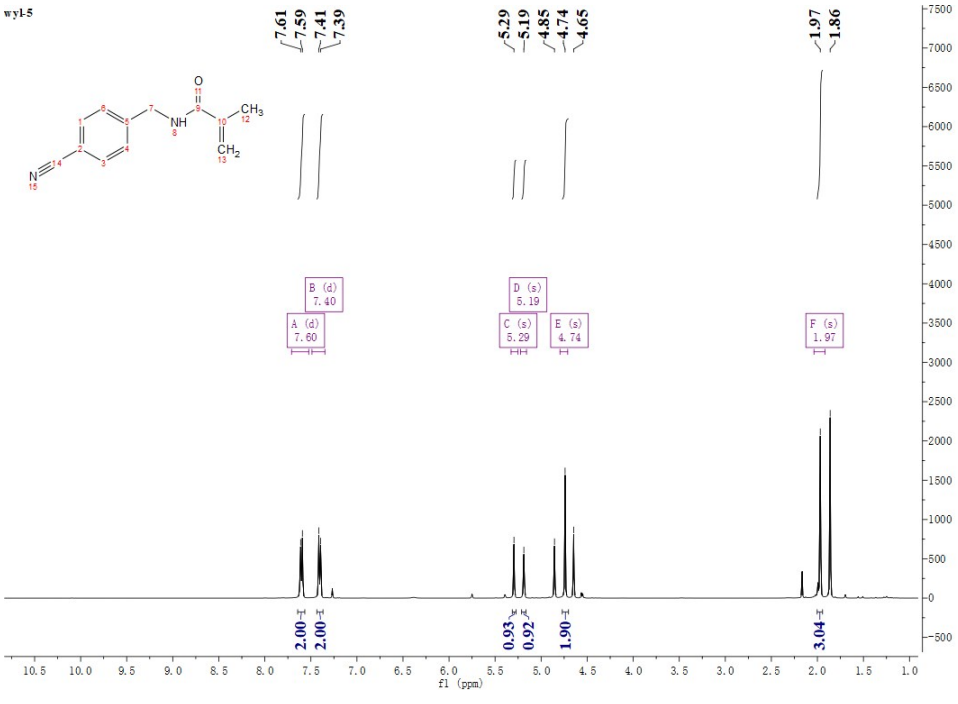

Fig. S3 NMR spectrum of the Ethylene-based Raman monomer. 1H NMR (400 MHz, CDCl3) δ 7.61, 7.59, 7.41, 7.39, 5.29, 5.19, 4.85, 4.74, 4.65, 1.97, 1.86.

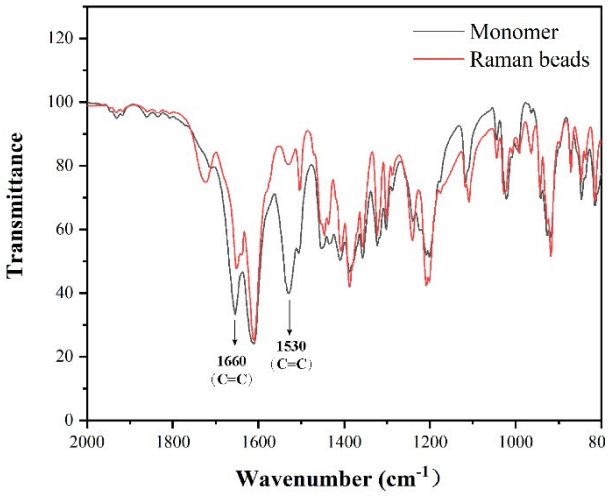

Fig. S4 FT-IR spectra of the monomer and Raman beads.

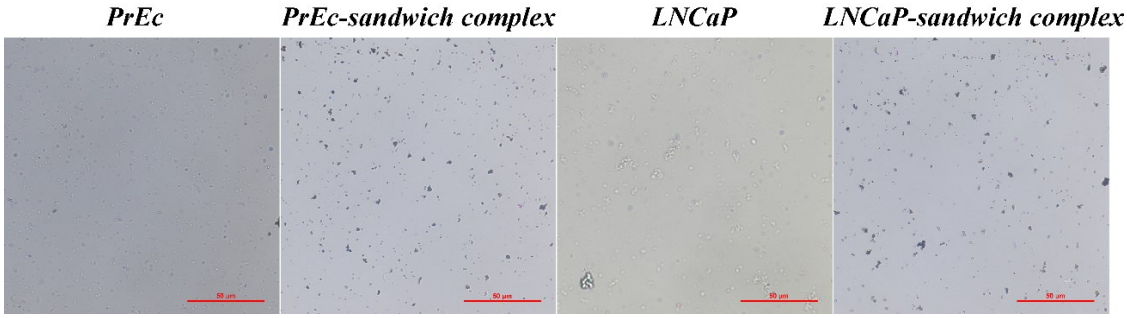

Fig. S5 Bright-field images of PrEC exosomes, CD63-Mag/PrEC exosome/Raman beads, LNCaP exosomes, and CD63-Mag/LNCaP exosome/Raman beads. Scale bars, 50 μm.

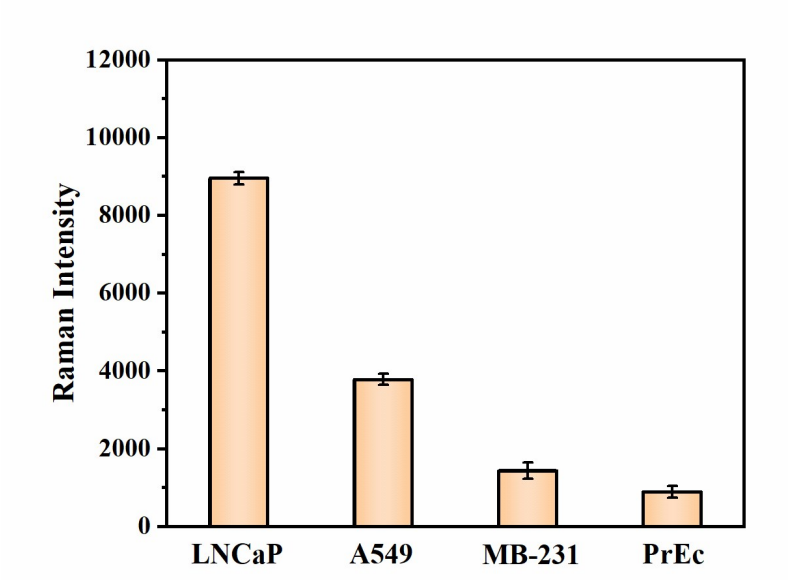

Fig. S6 Specificity of the microfluidic Raman chip, error bars indicate standard deviation of measurements (n=3).

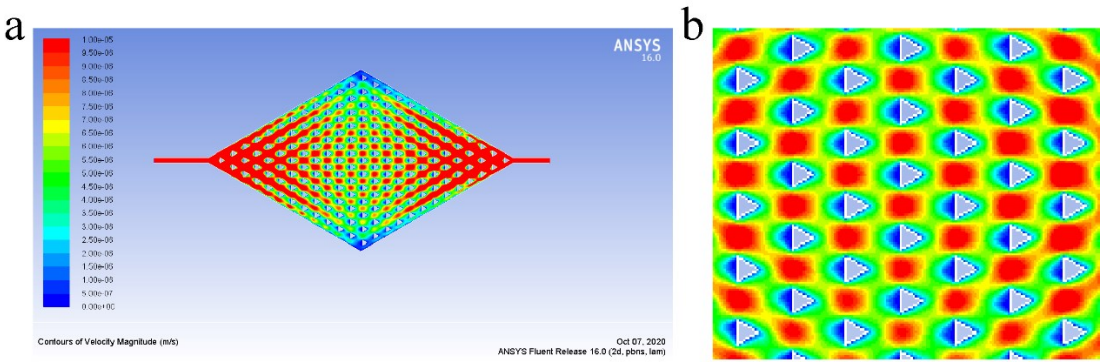

Fig. S7 (a) Finite element simulations of the flow velocity profile inside the staggered triangular pillars array. (b) A larger view of the middle mixing chamber.

Fig. S8 Photographs of red and blue inks flowing in the microfluidic channel.

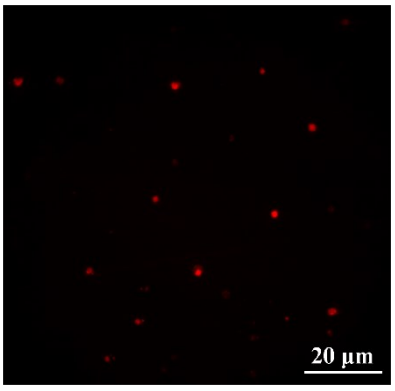

Fig. S9 The Mag-CD63-Exo complex fluorescence images on the triangular micropillar area of the chip.

Table S1. Information on clinical serum samples.

Patient ID	TNM	Sex	Age, years	PLT, 10^9 L^{-1}	Pathology

1	NA	M	53	-	Control
2	NA	M	56	-	Control
3	NA	M	52	-	Control
4	NA	M	52	-	Control
5	NA	M	51	-	Control
6	NA	M	53	-	Control
7	NA	M	55	-	Control
8	NA	M	54	-	Control
9	T2N0M0	M	71	127	Malignant
10	T1N0M0	M	75	223	Malignant
11	T3N0M0	M	74	118	Malignant
12	T2N0M0	M	72	188	Malignant
13	T4N0M1	M	78	180	Malignant
14	T1N0M0	M	76	197	Malignant
15	T2N0M0	M	75	198	Malignant
16	T2N0M0	M	77	140	Malignant
17	T2N0M0	M	59	268	Malignant
18	T2N0M0	M	79	177	Malignant

Table S2. Comparison of different microfluid chip methods for detection of exosomes

Target	**Detection method**	**LOD**	**Volume**	**Detection time**	**Ref**
PSA	Immunoassay	0.01 ng mL^{-1}	50 μL	5 min	[1]
Hepatocellular exosomes	Electrochemical assay	4.39×10^3 particles mL^{-1}	30 μL	3.5 h	[2]
Ovarian cancer exosomes	Fluorogenic	---	>20 μL	40 min	[3]

	ELISA				
Ovarian cancer exosomes	Fluorogenic ELISA	5×10^4 particles mL^{-1}	20 μL	>2 h	[4]
SKBR3, T84, and LNCaP exosomes	SERS	3.2×10^4 particles mL^{-1} 7.3×10^4 particles mL^{-1} 2.03×10^5 particles mL^{-1}	2 μL	>2 h	[5]
HepG2 exosomes	SERS	2.7×10^4 particles mL^{-1}	200 μL	>10 h	[6]
Breast cancer exosomes	SERS	2×10^6 particles mL^{-1}	15 μL	2 h	[7]
Prostate cancer exosomes	Raman spectroscopy	1.6×10^2 particles mL^{-1}	20 μL	1 h	This work

LOD, limit of detection

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