Appendix A.

Supplementary material

A simple and innovative sample preparation method for on-site SARS-CoV-2 molecular diagnostics

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Fig. S1. RT-LAMP reaction with lysis buffer diluent.

(a) The amplification plot of yellow colors are the reaction with 1/5 lysis buffer A diluent, light green colors are with 1/50 lysis buffer A diluent, green colors are with 1/500 lysis buffer A diluent, and the purple colors are with negative control.

(b) The amplification plot of yellow colors are the reaction with 1/5 lysis buffer B diluent, light green colors are with 1/50 lysis buffer B diluent, green colors are with 1/500 lysis buffer B diluent, and the purple colors are with negative control.

Fig. S2. qPCR amplification plot with different elution volume.

(a) The amplification plot is with 300 μL elution volume with optimized single wash protocol. The amplification plot of yellow colors are the reaction with 300 μL eluent, the light green colors are with 1/10 diluent of the eluent, the green colors are with 1/100 diluent of 300 μL eluent, and the blue colors are with 1/k diluent of 300 μL eluent.

(b) The amplification plot is with 1100 μL elution volume with optimized single wash protocol. The amplification plot of yellow colors are the reaction with 1100 μL eluent, the light green colors are with 1/10 diluent of 1100 μL eluent, the green colors are with 1/100 diluent of 1100 μL eluent, and the blue colors are with 1/k diluent of 1100 μL eluent.

Fig. S3. PCR differences by silica-coated bead volume.

The silica-coated bead enriches the DNA concentration over 200%. Maximum enrichment was achieved with 40 μL of beads ($R^2=0.92$).

Table S1. Usual properties of membranes.

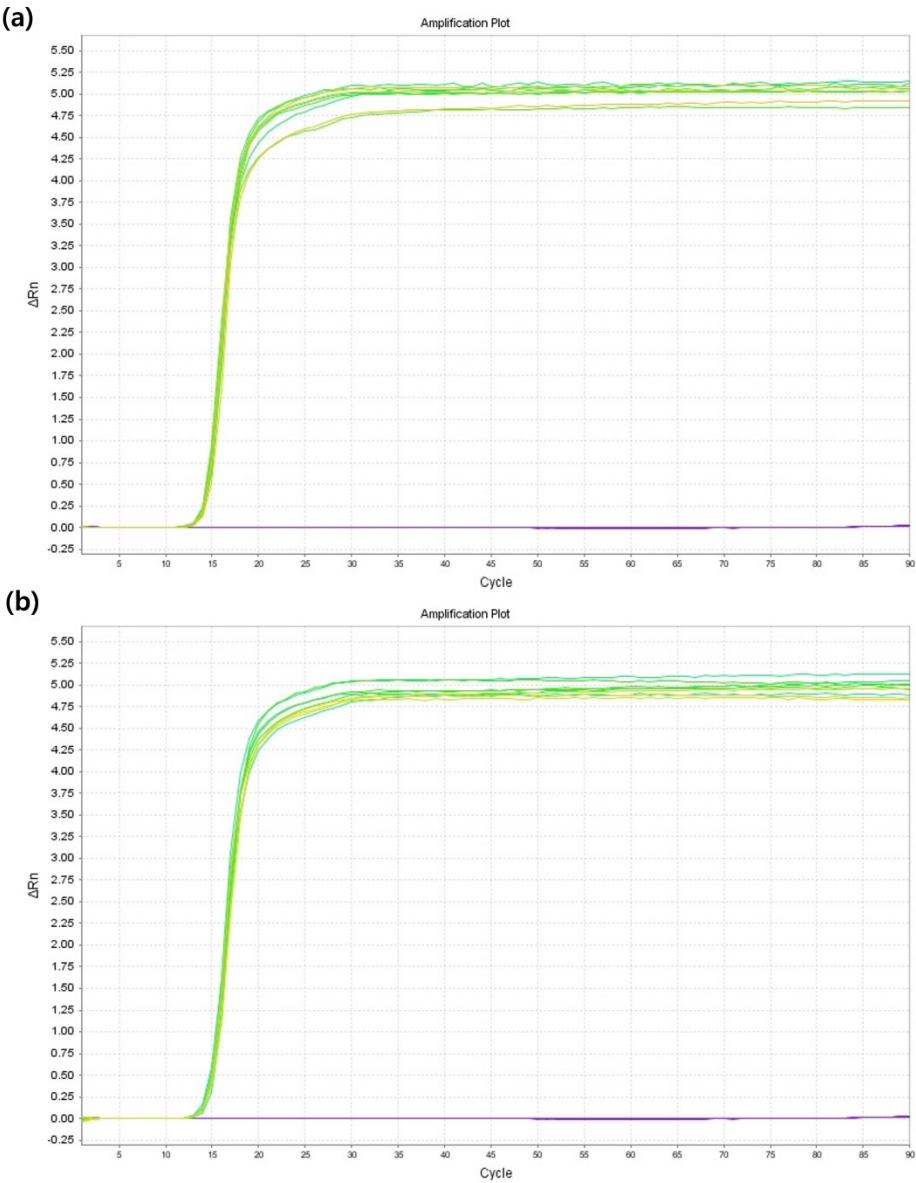**Fig. S1.**
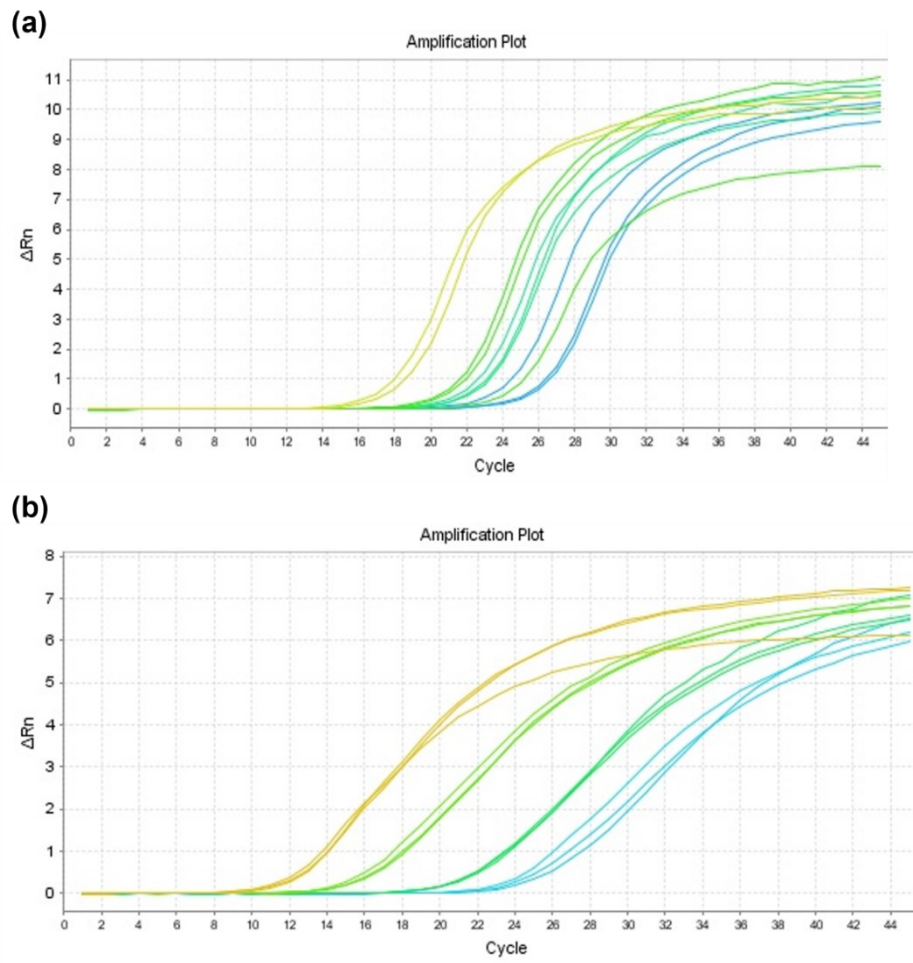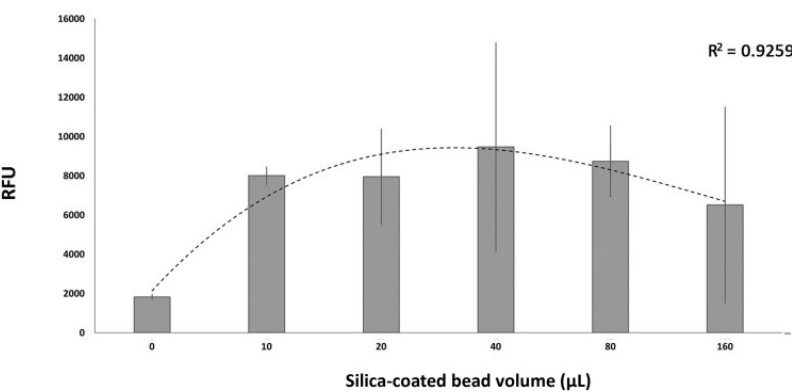
(a)

(b)

Fig. S2.

(a)

(b)

Fig. S3.

Table S1.

#	Name	Manufacturer	Basic weight (g/m²)	Thickness (mm)	Retention weight (µm)	Pressure drops (mbar)
1	Glass filter GF/F	Whatman	N/A	0.42	0.7	N/A
2	Glass filter GF/D	Whatman	N/A	0.67	2.7	N/A
3	Glass filter GC-50	ADVANTEC	53	0.19	0.5	N/A
4	Silica membrane	Biocomma	N/A	N/A	N/A	N/A
5	Glass filter (grade 141)	Boreda	N/A	N/A	N/A	N/A
6	GF-A	Hyundai Micro	52	0.23	1.6	38
7	GF-B	Hyundai Micro	143	0.7	1	95
8	GF-C	Hyundai Micro	52	0.24	1.2	55
9	GF-D	Hyundai Micro	120	0.53	2.7	140
10	GF-E	Hyundai Micro	75	0.45	0.7	120
11	Conjugation pad	N/A	75	N/A	N/A	N/A
12	Cellulose pad	Biocomma	N/A	N/A	N/A	N/A
13	Silica membrane	Biocomma	N/A	N/A	N/A	N/A
	Chromatography paper	Whatman	N/A	N/A	N/A	N/A