Electronic Supplementary Material

Sensitively detecting antigen of SARS-CoV-2 by NIR-II fluorescent nanoparticles

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Table S1 The operation procedure and cost of the materials needed of NIR-II LFA

Procedure	Steps	Materials needed	Cost of materials
Preparation stage	1) Equilibrate reagents to room temperature		
	2) Startup preparation and parameter initialization		
	3) Sample collection		
	4) Lysis virus	Swab	U.S.$0.1
	5) Nasal swabs are added to the lysis buffer	Tube containing virus lysis buffer	U.S.$0.4
Testing process	1) 100 μL of lysis buffer containing nasal swabs is sucked to the test card of NIR-II LFA	Test card (antibody; NIR-II nanoparticles; aluminum foil bag…)	U.S.$0.5
	2) After 15 min, insert the test card to the reader device, and then start capturing the fluorescence signal	Fluorescent reader device	U.S.$550
Total			U.S.$1.0 / test[a)]

a): The overall cost of each test according to the commercial NIR-II LFA kit, not including the fluorescence reader device which can be reused.

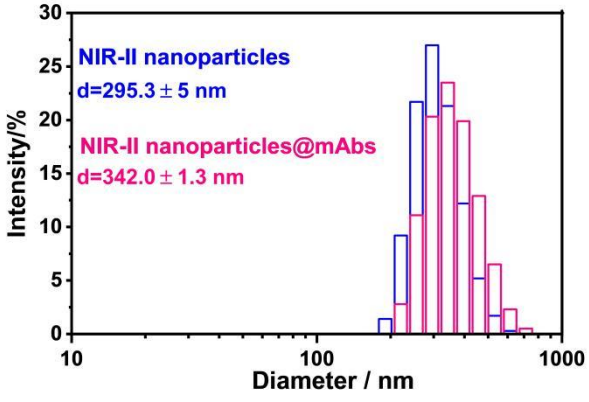

Figure S1 The dynamic light scattering results of the NIR-II nanoparticles. The NIR-II nanoparticles mean diameter is 295.3±5 nm, and the hydrodynamic size of the NIR-II nanoparticles@mAbs is 342.0±1.3 nm.

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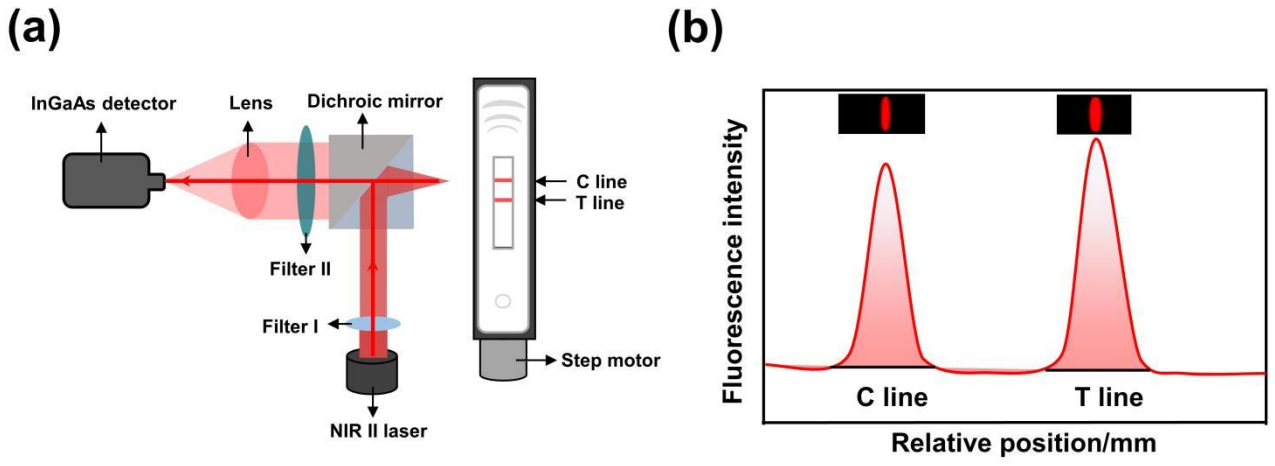

Figure S2 The components and testing principle of NIR-II LFA. (a) Schematic of the reader. (b) The definition of T and C value by peak area integration.

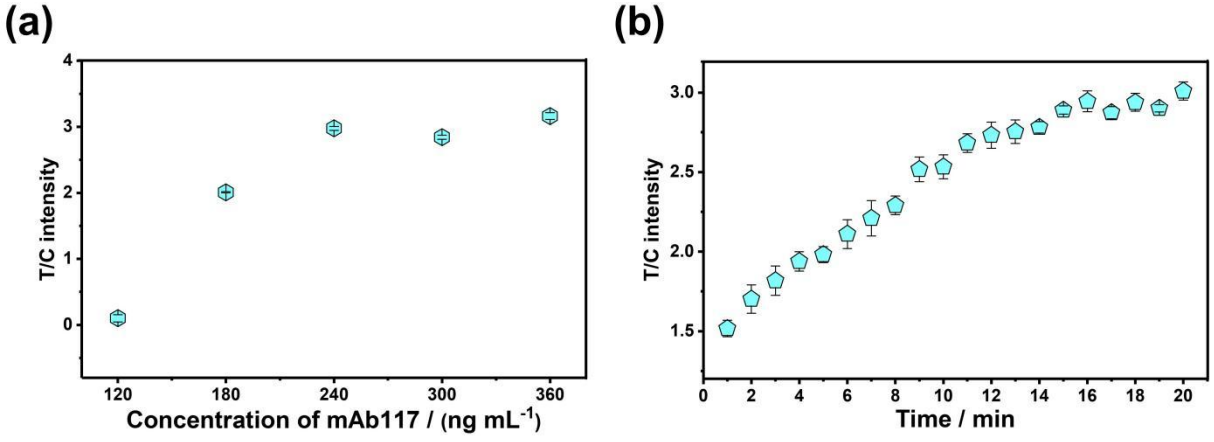

Figure S3 Optimization of main parameters pertaining to the LFA performance. (a) T/C intensity versus different amounts of antibodies conjugated to the NIR-II nanoparticles. (b) Immunoreaction time effect on T/C intensity. The error bars were calculated over triplicates.

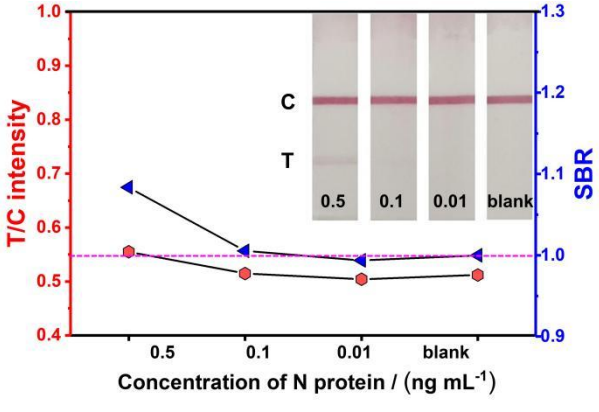

Figure S4 T/C intensity and SBR of the colloidal gold LFA (Wandfo Biotech Co., Ltd.) at various concentrations (calculated from the pixel values by ImageJ software). Inset showed the optical images of the test strips.

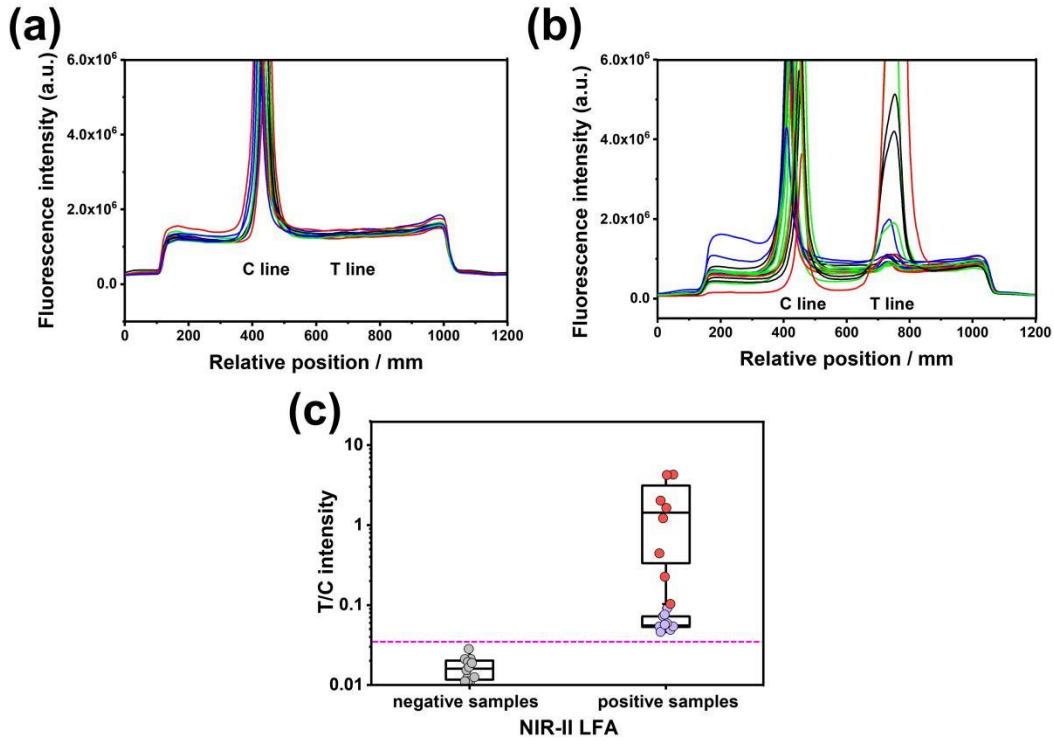

Figure S5 The fluorescence intensity distribution curve and T/C values of the strips for 30 clinical samples by NIR-II LFA. (a)12 negative samples; (b) 18 positive samples; (c) the T/C value difference between the negative swabs and positive swabs (the purple indicated the T/C value of the swab samples with low antigen concentrations).

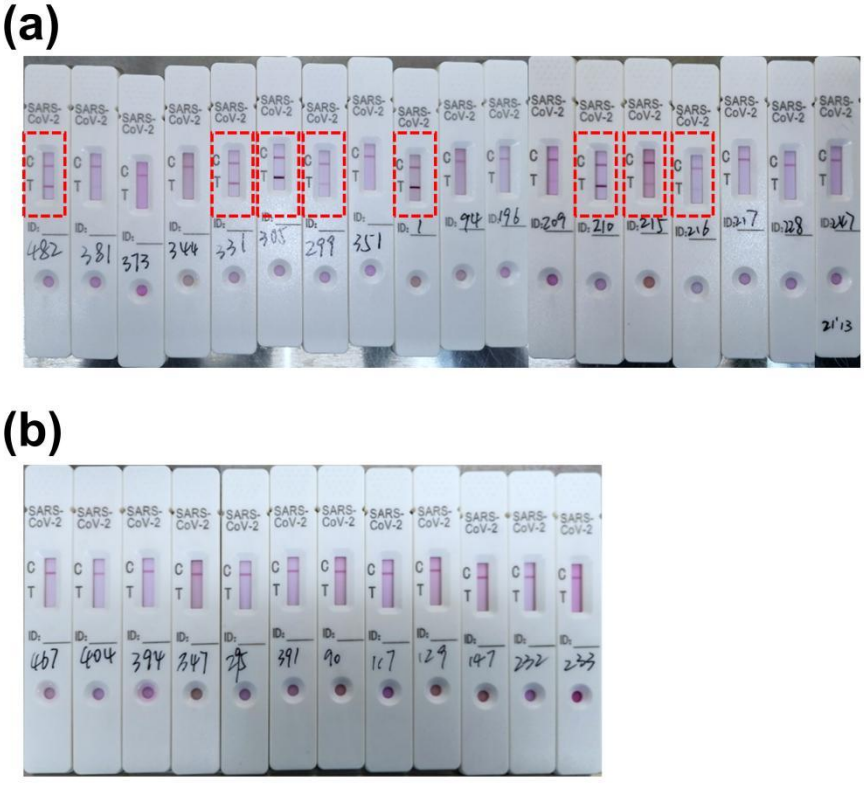

Figure S6 Results of the clinical swab samples detected by colloidal gold LFA. (a) the positive samples; (b) the negative samples. The red boxes indicate the positive cases detected.