

Supporting Information

A Single and Two-Stage, Closed-Tube, Molecular Test for the 2019 Novel Coronavirus (COVID-19) at Home, Clinic, and Points of Entry

Mohamed El-Tholoth^{a,b}, Haim H. Bau^a, Jinzhao Song^{a*}

- a. Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia PA, USA
- b. Department of Virology, Faculty of Veterinary Medicine, Mansoura University, Mansoura 35516, Egypt

*Corresponding author: songjinz@seas.upenn.edu

Table S1. Coronavirus sequences used for alignment in this study.

Coronavirus	GISAIID or Genbank accession ID	Specimen source	Country	Patient age	Collection date
COVID-2019	EPI_ISL_402119	Alveolar lavage fluid	China	49	2019-12-30
COVID-2019	EPI_ISL_402120	Alveolar lavage fluid	China	61	2020-01-01
COVID-2019	EPI_ISL_402121	Alveolar lavage fluid	China	32	2019-12-30
COVID-2019	EPI_ISL_402123	Bronchoalveolar lavage fluid	China	65	2019-12-24
COVID-2019	EPI_ISL_402124	Bronchoalveolar lavage fluid	China	49	2019-12-30
COVID-2019	EPI_ISL_402126	Throat swab	Japan	30	2020-01-14
COVID-2019	EPI_ISL_402127	Bronchoalveolar lavage fluid	China	32	2019-12-30
COVID-2019	EPI_ISL_402128	Bronchoalveolar lavage fluid	China	52	2019-12-30
COVID-2019	EPI_ISL_402129	Bronchoalveolar lavage fluid	China	40	2019-12-30
COVID-2019	EPI_ISL_402130	Bronchoalveolar lavage fluid	China	56	2019-12-30
COVID-2019	EPI_ISL_403932	Endotracheal aspirates	China	66	2020-01-14
COVID-2019	EPI_ISL_403933	Endotracheal aspirates	China	65	2020-01-15
COVID-2019	EPI_ISL_403936	Throat swab	China	68	2020-01-17
COVID-2019	EPI_ISL_403937	Nasal swab	China	49	2020-01-18
COVID-2019	EPI_ISL_403962	Nasopharyngeal swab and Throat swab	Thailand	61	2020-01-08
COVID-2019	EPI_ISL_403963	Nasopharyngeal swab and Throat swab	Thailand	74	2020-01-13
COVID-2019	EPI_ISL_404253	Sputum	USA	63	2020-01-21
COVID-2019	EPI_ISL_404895	Oropharyngeal swab	USA	30	2020-01-19
TGEV	Genebank NC_038861.1	--	--	--	--
PDCoV	Genebank KX022605.1	--	--	--	--
PEDV	Genebank NC_003436.1	--	--	--	--
IBV	Genebank NC_001451.1	--	--	--	--
HCoV-229E	Genebank NC_002645.1	--	--	--	--
OC43	GenBank KX344031.1	--	--	--	--
NL63	GenBank JX504050.1	--	--	--	--
HKU1	GenBank	--	--	--	--

	KF686346.1				
SARS	Genebank NC_004718.3	--	--	--	--
MERS	Genebank NC_019843.3	--	--	--	--

Table S2. Synthesized COVID-19 DNA (619bp).

Sequence (5' to 3')
CTGCTAAAGCTTACAAAGATTATCTAGCTAGTGGGGGACAACCAATCACTAATTGTGTTA AGATGTTGTGTACACACACTGGTACTGGTCAGGCAATAACAGTTACACCGGAAGCCAAT ATGGATCAAGAATCCTTTGGTGGTGCATCGTGTGTTGTCTGTACTGCCGTTGCCACATAGAT CATCCAAATCCTAAAGGATTTTGTGACTTAAAAGGTAAGTATGTACAAATACCTACAACCTT GTGCTAATGACCCTGTGGGTTTTACACTTAAAAACACAGTCTGTACCGTCTGCGGTATGT GGAAAGGTTATGGCTGTAGTTGTGATCAACTCCGCGAACCCATGCTTCAGTCAGCTGAT GCACAATCGTTTTTAAACGGGTTTTCGCGGTGTAAGTGCAGCCCGTCTTACACCGTGCGGC ACAGGCACTAGTACTGATGTCGTATACAGGGCTTTTGACATCTACAATGATAAAGTAGCT GGTTTTGCTAAATTCCTAAAACTAATTGTTGTCGTTCCAAGAAAAGGACGAAGATGAC AATTTAATTGATTCTTACTTTGTAGTTAAGAGACACACTTTCTCTAACTACCAACATGAAGA ACAATTTATAATTTACTT

Table S3. The sequences of PCR primers and TaqMan probe.

Primer name	Sequence (5' to 3')
COVID-2019-Fw	CCCTGTGGGTTTTACACTTAA
COVID-2019-Rv	ACGATTGTGCATCAGCTGA
COVID-2019-Probe	/56-FAM/CCGTCTGCGGTATGTGGAAAGGTTATGG/3BHQ_1/

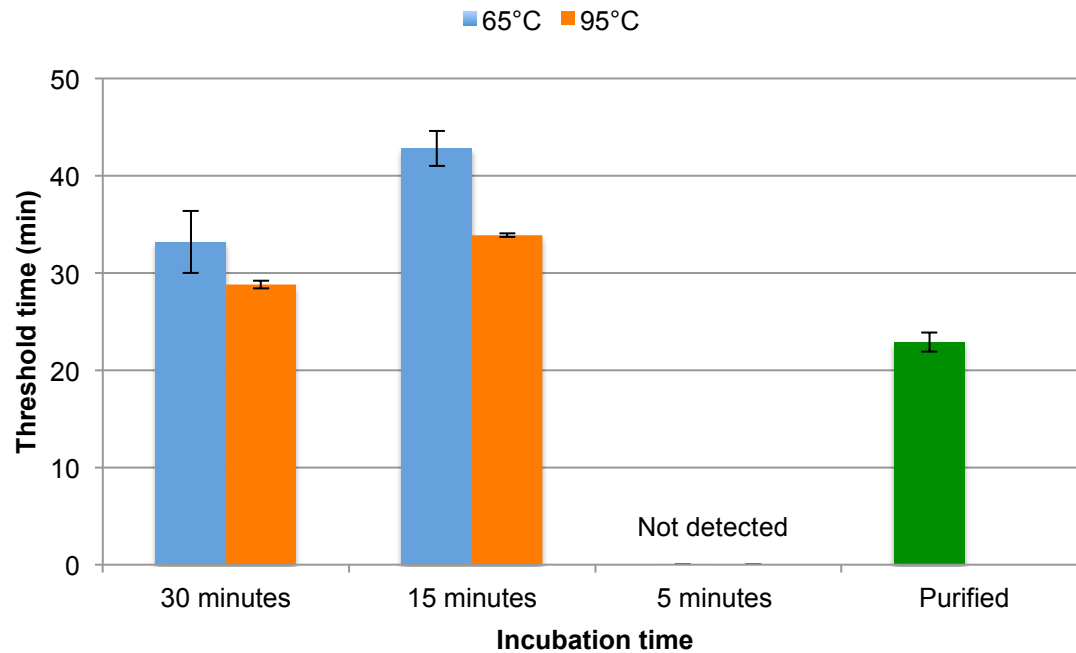


Figure S1. Rapid Sample Preparation for one-tube Penn-RAMP. 500 HIV virus particles were spiked in nasal swab and heated at 65°C and 95°C with various times (indicated). Their threshold times were compared with the one from purified HIV RNA (500 copies).

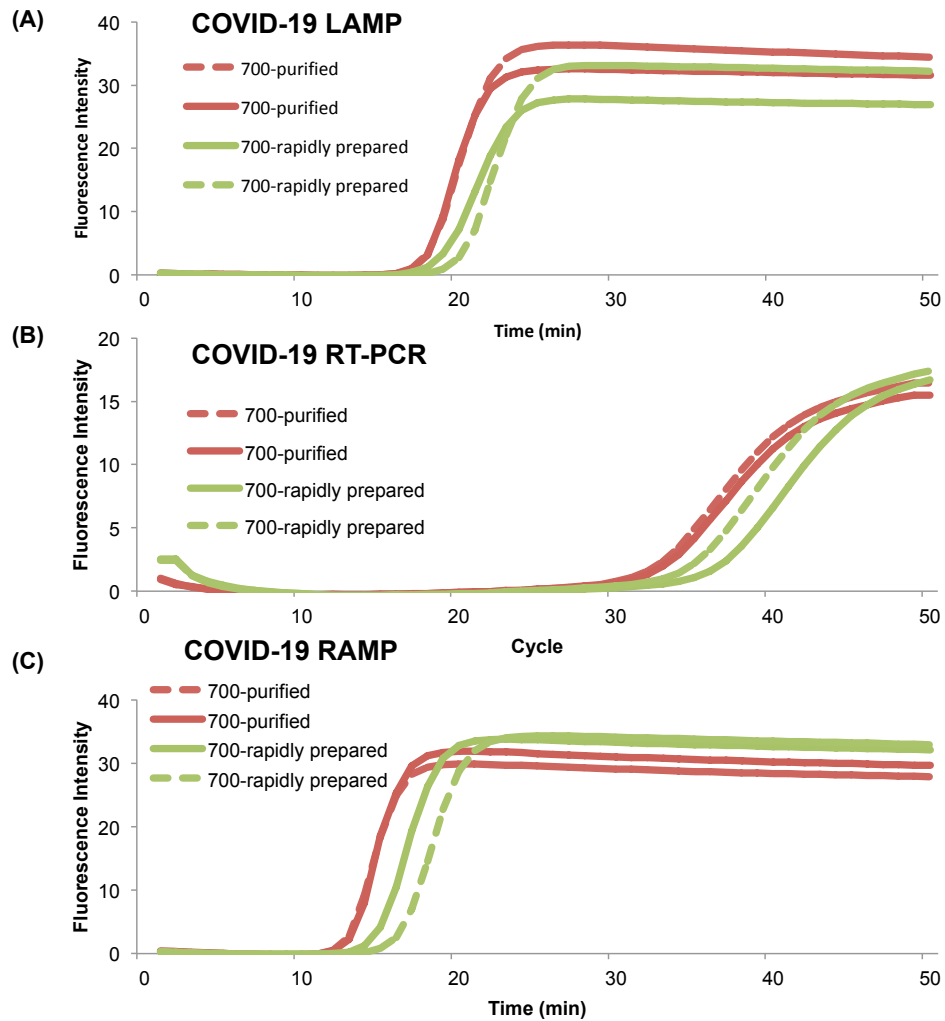


Figure S2. Comparison of threshold times or cycle of purified and rapidly prepared samples. (A) LAMP, (B) RT-PCR, (C) Closed-Tube Penn-RAMP. Threshold time and cycle of the rapidly prepared sample compared with the purified sample. 700 copies of COVID-2019 synthetic DNA were used for the testing.