Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

Characterization methods in porous materials for the rational design of multi-step processing in the context of a paper microfluidic phenylalanine test

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Table S1A. Determining A/C Substrate Capacity. A/C glass fiber mass before and after fluid filled a 1 cm^2 square piece of material. The mass of water was estimated by calculating the difference.

Mass of dry A/C pad (mg)	Mass of wet A/C pad (mg)	Mass of water (mg)
5.4	33.4	28.0
5.0	33.4	28.4
5.2	32.9	27.7
5.0	33.0	28.0
5.0	33.1	28.1

Table S1B. Determining A/E Substrate Capacity. A/E glass fiber mass before and after fluid filled a 1 cm^2 square piece of material. The mass of water was estimated by calculating the difference.

Mass of dry A/E pad (mg)	Mass of wet A/E pad (mg)	Mass of water (mg)
6.7	48.1	41.4
6.8	44.9	38.1
6.8	43.7	36.9
6.6	47.0	40.4
6.9	44.7	37.8

Table S2A. Mass measurements of plasma transferred to enzymatic A/C glass fiber pad from upstream GR-PSM at different times (replicates).

Time from blood sample addition to GR-PSM	Mass of dry pad (mg)	Mass of wet pad (mg)	Mass of plasma (mg)
15 seconds	557.9	562.6	4.7
	556.6	561.2	4.6
	563.3	568.8	5.5
1 minute	558.6	564.5	5.9
	557.7	563.5	5.8
	557.0	562.1	5.1
2 minute	559.9	565.5	5.6
	559.0	564.6	5.6
	560.2	565.5	5.3
3 minute	562.5	567.8	5.3
	563.9	569.7	5.8
	563.1	569.0	5.9

Table S2B. Mass measurements of plasma transferred to enzymatic A/C glass fiber pad from upstream GX-PSM at different times (replicates).

Time from blood sample addition to GX-PSM	Mass of dry pad (mg)	Mass of wet pad (mg)	Mass of plasma (mg)
15 seconds	559.5	562.8	3.3
	555.9	559.3	3.4
	555.4	557.6	2.2
1 minute	554.6	559.0	4.4
	557.6	562.1	4.5
	537.1	540.9	3.8
2 minutes	554.7	559.0	4.3
	553.3	557.6	4.3
	559.5	564.1	4.6

3 minutes	556.4	560.8	4.4
	558.9	563.2	4.3
	560.7	565.3	4.6

Table S3A. Mass measurements of plasma transferred to smaller (fluid capacity 3.1 μL) colorimetric A/C glass fiber pad from upstream GR-PSM after 2 minutes (replicates).

Mass of dry pad (mg)	Mass of wet pad (mg)	Mass of plasma (mg)
143.5	145.1	1.6
142.6	144.3	1.7
142.7	144.5	1.8

Table S3B. Mass measurements of plasma transferred to larger (fluid capacity 4.2 μL) colorimetric A/C glass fiber pad from upstream GR-PSM after 2 minutes (replicates).

Mass of dry pad (mg)	Mass of wet pad (mg)	Mass of plasma (mg)
143.8	146.4	2.6
136.2	138.3	2.1
143.5	145.4	1.9

Figure S1. Standard addition plot of normalized signal vs. spiked-in phenylalanine (Phe) concentration that indicates the endogenous phenylalanine concentration in the background plasma matrix (magnitude of the x-intercept) is approximately 1.3 mg/dL. (Inset) The lowest three spiked-in phenylalanine concentrations were used for the linear fit, since the curve deviates from linearity at higher concentrations.