## **Supporting Information**

## Thermal Detection of Cardiac Biomarkers H-FABP and ST2 Using a Molecularly Imprinted Nanoparticle-Based Multiplex Sensor Platform

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Figure S-1. This is a schematic representation and Scanning Electron Microscopy image of the thermocouple that is dipcoated with nanoMIPs on the tip, located at  $T_2$ . Heat can freely pass through the thermocouple in the case of buffer solution, while when the analyte binds to the MIP-layer it blocks the heat-flow in a certain direction and decreases the temperature that is measured at  $T_2$ . The temperature at  $T_1$  is strictly controlled at 37.00 °C and the flowcell into which the thermocouple is placed is made of Perspex. Reproduced from Canfarotta *et al.*<sup>1</sup> – Published by The Royal Society of Chemistry.



Figure S-2. Schematics of the flow cells used in this research. A) A flow cell that incorporates a single thermocouple. B) Two single flow cells connected in series using a linking tube. C) A modified flow cell to incorporate two thermocouples, where the inlets for the thermocouples are directly opposite each other in the flow cell. D) A modified flow cell to incorporate three thermocouples, where the flow chamber has been elongated by 4 mm. This allows for all three thermocouples to be lie parallel to each other and span the entire width of the cell.



Figure S-3. SPR plots of the response versus time for A) ST2 nanoMIPs and B) H-FABP nanoMIPs.



Figure S-4. A) Schematic representation of the single thermocouple flow cell used in the experiments. B) Raw data HTM plot of temperature *versus* time for the addition of ST<sub>2</sub> ( $_{3.15} - _{315}$  ng/mL) in PBS to a single flow cell with a thermocouple functionalized with ST<sub>2</sub> nanoMIPs. C) Raw data HTM plot of temperature *versus* time for the addition of H-FABP ( $_{1.5} - _{150}$  ng/mL) in PBS to a single flow cell with a thermocouple functionalized with h-FABP nanoMIPs.



Figure S-5. A) Schematic representation of the single thermocouple flow cell used in the experiments. B) Raw data HTM plot of  $R_{th}$  versus time for the addition of BSA (6.6 – 664 ng/mL) in PBS to a single flow cell with a thermocouple functionalized with ST<sub>2</sub> nanoMIPs. C) Raw data HTM plot of temperature versus time for the addition of BSA (6.6 – 664 ng/mL) in PBS to a single flow cell with a thermocouple functionalized with h-FABP nanoMIPs.



Figure S-6. A) Schematic representation of the single thermocouple flow cells in series used in the experiments. B) Raw data HTM plot of temperature *versus* time for the addition of ST<sub>2</sub> ( $_{3.15} - _{315}$  ng/mL) in PBS to two flow cells in series. Flow cell one consisted of a thermocouple functionalised with ST<sub>2</sub> nanoMIPs (red) and flow cell two consisted of an un-functionalised thermocouple (black). C) Raw Data HTM plot of R<sub>th</sub> *versus* time for the addition of ST<sub>2</sub> ( $_{3.15} - _{315}$  ng/mL) in PBS to two flow cells in series. Flow cell one consisted of a thermocouple (black). C) Raw Data HTM plot of R<sub>th</sub> *versus* time for the addition of ST<sub>2</sub> ( $_{3.15} - _{315}$  ng/mL) in PBS to two flow cells in series. Flow cell one consisted of a thermocouple functionalised with ST<sub>2</sub> nanoMIPs (black) and flow cell two consisted of an un-functionalised thermocouple (purple).



Figure S-7. A) Schematic representation of the triple thermocouple flow cell used in the experiments. B) A plot of the temperature measured at each of the three thermocouples (Purple = Thermocouple 1, Red = Thermocouple 2, Green = Thermocouple 3) *versus* the temperature of the copper block. C) Temperature gradient (25, 30, 35, 40 °C) plot of the temperature measured at each thermocouple *versus* time. The purple line shows thermocouple 1 in position 1, dashed blue shows thermocouple 1 in position 3. The red line shows thermocouple 2 in position 2, dashed red shows thermocouple 2 in position 1. The green line shows thermocouple 3 in position 3, dashed green shows thermocouple 3 in position 2.



Figure S-8. A) 2D temperature contours for central plane of the flow cells at steady state (300 s simulation time). B) Area averaged fluid temperature at the position of the thermocouple tip for the triple cell. C) 2D contours of velocity magnitude in the central plane of the flow cell at steady state (300 s simulation time). D) Area averaged velocity magnitude for the central plane of the flow cell as a function of time.

References:1. Canfarotta, F.; Czulak, J.; Betlem, K.; Sachdeva, A.; Eersels, K.; Van Grinsven, B.; Cleij, T.; Peeters, M., A novel thermal detection method based on molecularly imprinted nanoparticles as recognition elements. *Nanoscale* **2018**, *10* (4), 2081-2089.