Electronic Supplementary Information for

Simultaneous Quantitative Detection of Hematocrit and Hemoglobin from Whole Blood using a Multiplexed Paper Sensor with a Smartphone Interface

Anjali[1], Soumen Das,[1] Suman Chakraborty[2*]

a. [1]*School of Medical Science and Technology, Indian Institute of Technology Kharagpur, Kharagpur- 721302, West Bengal, India.*
b. [2]*Department of Mechanical Engineering, Indian Institute of Technology Kharagpur, Kharagpur- 721302, West Bengal, India.*

*To whom correspondence should be addressed. E–mail: sumanchakrabortyiitkgp@gmail.com, suman@mech.iitkgp.ac.in

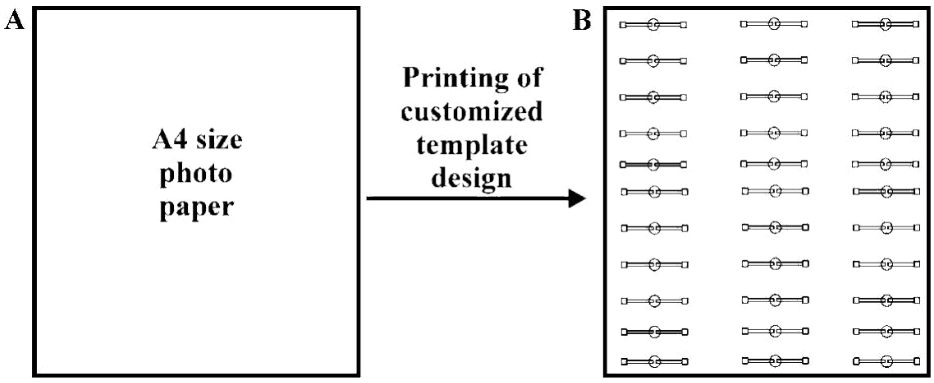

Fig. S1. Schematic of the sensor template mass fabrication (A) Substrate: A4 size photo paper. (B) The sensor array is printed on the non-glossy side of the photo paper.

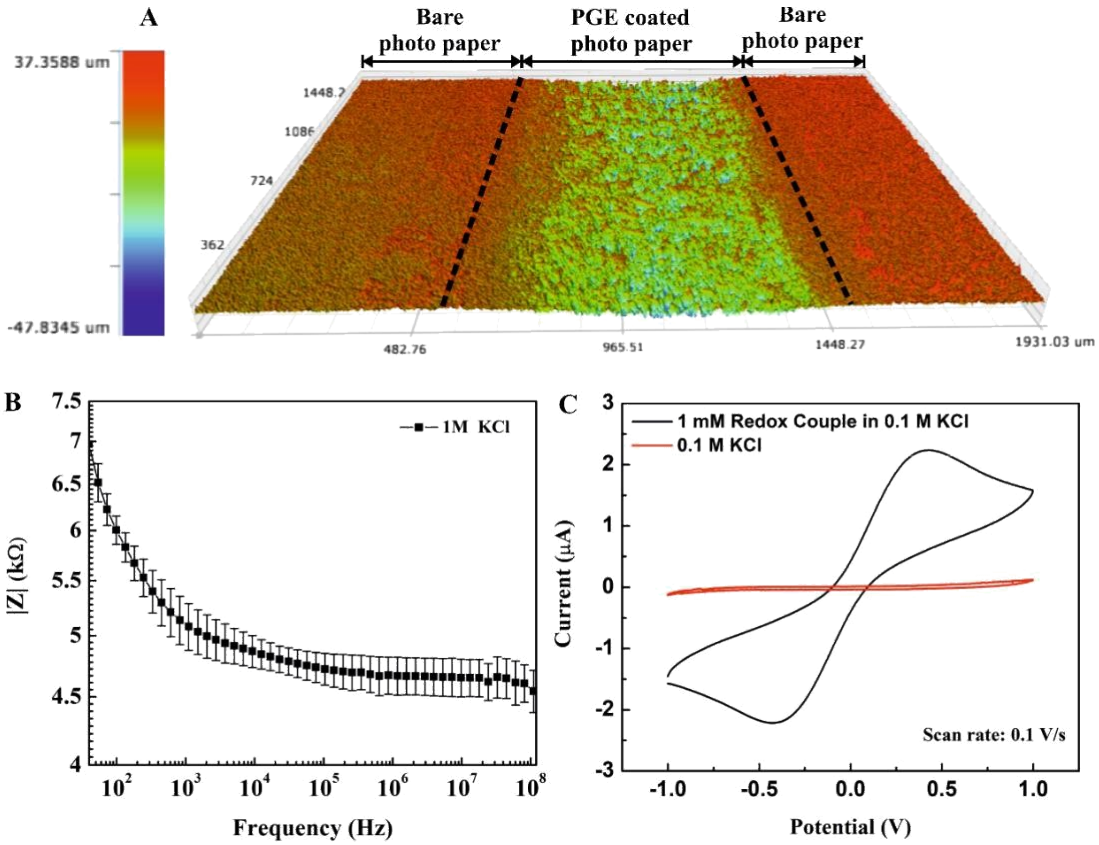

Fig. S2. Device Characterization (A) Optical surface profile image of the pencil graphite electrode deposited on the non-glossy side of the photo paper obtained using the non-contact mode 3D-optical surface profilometer, (B) Bode plot of the fabricated paper and pencil sensor after exposure to 1M KCl solution at a frequency between 40 Hz to 110 MHz, (C) Cyclic voltammograms of 0.1 M KCl and 1 mM K4[Fe(CN)6]/K3[Fe(CN)6] as a redox couple in 0.1 M KCl solutions recorded using non-treated PGE from −1 V to 1 V at 0.1 V/s scan rate.

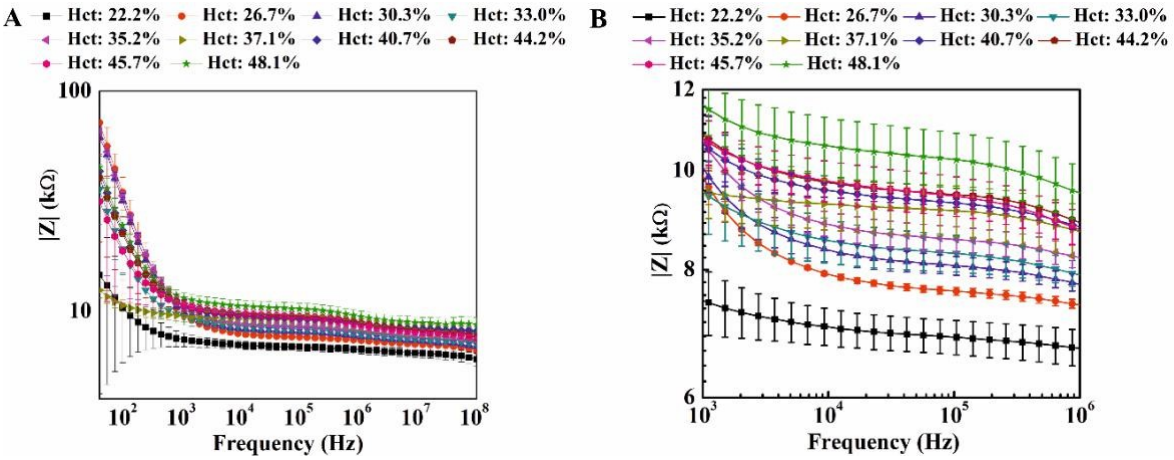

Fig. S3. (A) The impedance spectra of whole blood samples having different Hct (%) swept over the entire frequency spectrum between 40 Hz to 110 MHz, (B) Impedance spectra between 10 kHz to 1MHz frequency range for the blood samples.

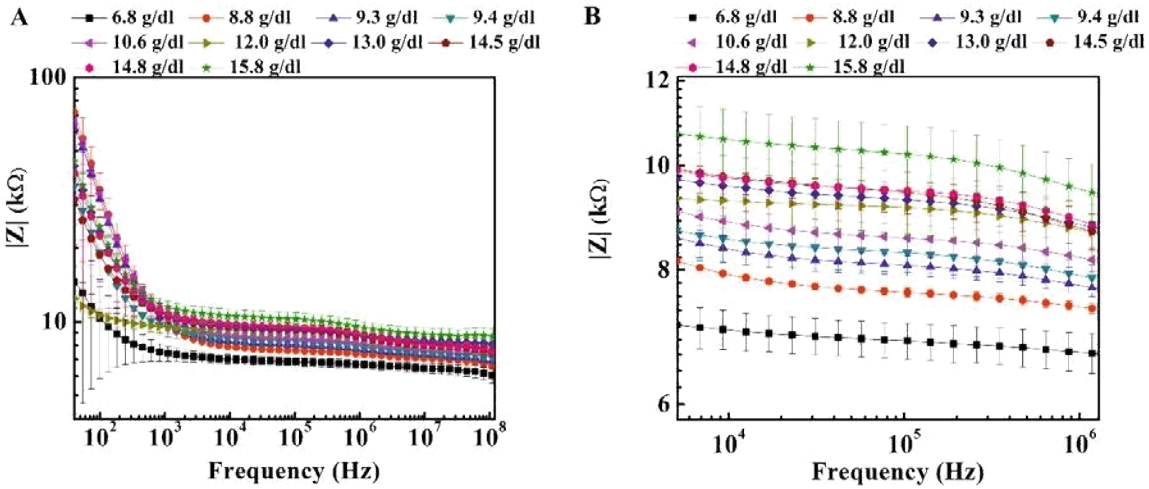

Fig. S4. (A) The impedance spectra of whole blood samples having different Hb values (g/dl) swept over the entire frequency spectrum between 40 Hz to 110 MHz, (B) Impedance spectra between 50 kHz to 1MHz frequency range for the blood samples.

Fig. S5. Graphical user interface of the in-house developed Hct and Hb Test app for user-friendly Hct and Hb level determination based on the calibration code.

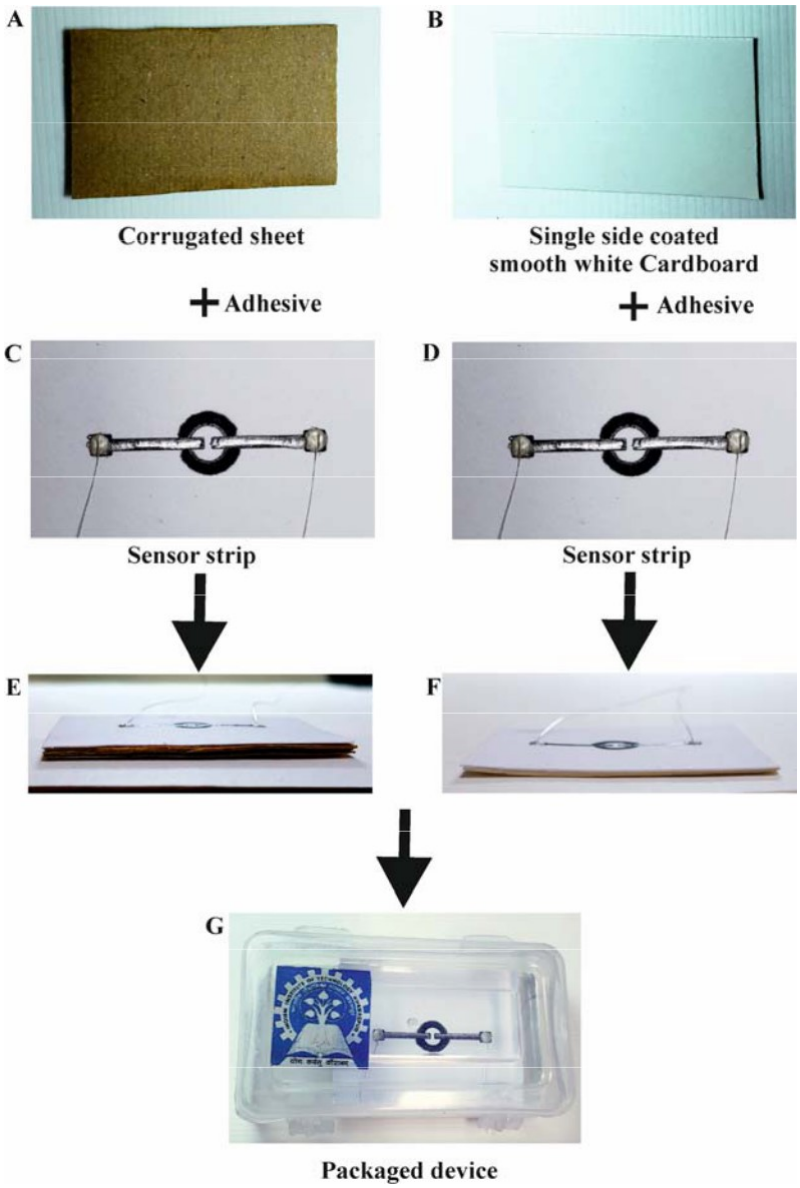

Fig. S6. Packaging and storage of device (A) Corrugated sheet (B) Single side coated smooth white cardboard (C) &(D) Disposable paper and pencil sensor strip (E) & (F) Side view of the device adhered to the corrugated sheet and single side coated smooth white cardboard, respectively, (G) Final packaged device inside transparent plastic box for long term storage. .

TableS1. Comparison of various parameters of the Bland and Altman plot for evaluation of different Hct and Hb measurement methods.

Measurement method	Bias	Standard deviation	Upper limit of agreement	Lower limit of agreement
Method 1	0.53	0.97	2.43	-1.36
Method 2	1.27	0.92	3.07	-0.53
Method 3	1.27	0.92	3.07	-0.53
Method 4	2.24	0.87	3.94	0.54
Method 5	-0.42	0.98	1.49	-2.34
Present work	0.11	0.45	0.82	-1.05