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Microfluidic chip based hematoanalyzer Using Polyelectrolytic Gel Electrodes

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We have fabricated a microfluidic blood cell counter using polyelectrolytic Gel electrodes(PGEs). Construction of the PGEs at specific locations within a microfluidic chip and subsequent DC-driven electrical detection were successfully performed. The PGEs have the following advantages. First, it can be relatively easily fabricated at lateral sidewalls of a microchannel, which enhances the robustness of cell detection. Second, it also enables the DC impedance analysis for increased cell detection sensitivity, which has been impossible with the conventional metal electrodes. Performance of the developed system was evaluated with fluorescent microbeads as well as human blood samples. Red blood cells passing between the two PGEs produced clear signals of impedance change in proportional to their size.

References

- [1] H. G. Chun, T. D. Chung, and H. C. Kim, Anal. Chem. vol. 77, pp. 2490-2495(2005)
- [2] E. Ayliffe, B. Fraier, IEEE Journal of Microelectromechanical System, vol. 8, pp. 50-57(1999)
- [3] U. D. Larsen, G. Blankenstein, Transducers '97, vol. 4, pp. 1319-1322(1997)
- [4] D. Huh, W. Gu, Y. Kamotani, J. B. Grothberg, and S. Takayama, Physiol. Meas, vol. 26, pp.R73-R98(2005)