

Template Based Electrochemical Synthesis of Co-rich Nanowires for Barcode Segment

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Sequential template electrochemical synthesis of multisegment nanowires with magnetic and non-magnetic segments have been extremely significant for barcoding, multiplexing and biosensing applications. Especially, Hard magnetic segment with high saturation magnetization and remanence materials are more convenient for multiplexing biological applications. We have synthesized three different types of magnetic nanowires CoNiP, CoPtP and CoFeP for a magnetic segment of barcode nanowires by electrochemical deposition technique using a polycarbonate membrane with a diameter of 50 nm. The length of all the nanowires was found to be around 6 μm . We compared the magnetic properties of all the synthesized materials and found that the CoPtP magnetic nanowires have higher saturation and remanence. In order to demonstrate the decoding of barcode nanowires using the magnetoresistance sensor in flow cytometry, we have calculated the spatial distribution of the stray magnetic field produced by the barcode nanowire by means of finite element method using the commercial Maxwell software. The CoPtP shows most higher spatial variation compared to the CoFeP and CoNiP, which means CoPtP is most advantageous composition for the hard magnetic segment of barcode nanowires.

References

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