

Abstract Submitted
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The Design and Fabrication of Bismuth Hall Effect Biosensors Capable of Detecting Superparamagnetic Nanoparticles¹ ANTHONY SIGILLITO, University of Dallas, MARTIN RUDOLPH, J.J. HEREMANS, VICKI SOGHOMONIAN, RAY KALLAHER, Virginia Tech — Because of their high sensitivity, accuracy, and low cost, the use of Hall biosensors promises to be an effective diagnostic technique that may aid in the early diagnosis of disease. Hall biosensors put out a voltage proportional to the strength of the magnetic field created by a magnetically labeled biomolecule attached to the surface of the sensor. These sensors were fabricated using bismuth thin films because bismuth has a low toxicity, low cost, and large Hall coefficient, making it an ideal material for medical applications. Hall bars were characterized by taking magnetoresistance measurements and were found to have good qualities for detecting the superparamagnetic nanoparticles that can be attached to biomolecules. One sensor was exposed to nanoparticles as a test of its efficacy with positive results. This research suggests that bismuth Hall biosensors are a promising alternative to traditional diagnostic techniques.

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