Nanotek-2013

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Nanotek & Expo

December 2-4, 2013 Las Vegas, USA

Planar hall resistance magnetic biosensor with femptomolar resolution

CheolGi Kim
Chungnam National University, Korea

Abstract

Among the various emerging bioassay technologies including optical, electrochemical and magnetic etc., the magnetic method via magnetic particles conjugated bio-recognition or inorganic agents is very promising approach because biological samples show essentially no magnetic background signal and also magnetic labels are insensitive to pH, ion concentration and surface charges. Planar Hall Resistance (PHR) sensors have the great advantages of higher signal-to-noise ratio, small offset voltage at zero fields, very linear response at low field region compare with other magnetoresistive sensors. The newly designed PHR sensor shows the higher field sensitivity nearly 15pT, which has been used for bio-entity super paramagnetic label detection. The interaction of biotin and streptavidin has been exploited for the performance test of robust and highly sensitive assays because the biotin label is stable and small enabling the streptavidin-biotin interaction. The detection of streptavidin conjugated with super paramagnetic label has been performed and succeed to detect a 2.9 femto-molar concentration. In addition, a sandwich magnetic bioassay system for the detection of thrombin using PHR sensor has been developed.

Biography

CheolGi Kim received the B.Sc. (1983) from Seoul National University, Ph.D (1989) from KAIST (Department of Physics), Korea. He has established the full Professor position in Department of Materials Science and Engineering in Chungnam National University from 2007. He has published more than 300 SCI journal articles, and holds 15 domestic and international patents. Prof. Kim is a member of IEEE Magnetics Society since 1991. He has serving General Trustee, The Korean Magnetics Society during 2009-2010, Trustee, and The Korean Magnetics Society since 2005.