

DNA-Mediated Sensitive Detection and Quantification of Rare Earth Ions Using Polymerase Chain Reaction

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(Received October 1, 2010; accepted November 16, 2010)

Key words: biosensing, DNA, lanthanum PCR, rare earth, real-time PCR

In this article, a novel approach to a highly sensitive and quantitative detection of rare earth ions by the polymerase chain reaction (PCR) technique is described, by focusing on the catalytic activities of rare earth ions towards deoxyribonucleic acid (DNA). The detection of rare earth ions is based on the observation that rare earth ions such as La³⁺ act against PCR-dependent amplification of DNA. In addition to the detection of rare earth ions by the conventional PCR protocol with agarose gel electrophoresis, we also quantified rare earth ions by real-time PCR. Finally, our approach using PCR greatly lowered the limit for the biochemical detection of rare earth ions at the ppb level.

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