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Abstract

Poly(acrylic acid) (PAA) brushes coated onto silica nanoparticles have been widely utilized in bioassays due to their abilities of providing favorable microenvironments and ensuring good biological activities for biomolecules. However, traditional PAA brushes are synthesized by reversible addition–fragmentation chain transfer polymerization. Hence, it is generally difficult to control and characterize the molecular weight of the PAA brushes, which may depress the reproducibility and bring more uncertain results. Herein, atom transfer radical polymerization method is employed to synthesize β-cyclodextrin-cored PAA with uniform and controllable molecular weight. After loading on the surfaces of adamantane-functionalized silica nanoparticles via host-guest interactions, glucose oxidase and probe single strand DNA (ssDNA) are further immobilized on the as-prepared nanoparticles. Meanwhile, capture ssDNA is functionalized on amino modified magnetic beads. In the presence of ssDNA sequence of Hepatitis B Virus (HBV) containing completely matched sequence of both probe and capture ssDNA, a