

Surface engineered nanocrystals for lateral flow assay

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We have developed magnetic nanoparticles (MPs) and quantum dots (QDs) with small hydrodynamic radius, containing various functional groups that readily compatible for conjugation to bio-molecules. The main advantage of making smallest MPs as possible is that we expect to see the enhancement in many properties including increase of diffusion rate and decrease of steric hindrance to bio-molecule conjugation when compared to the larger MPs. To achieve this goal, we'd like to design new biocompatible ligands, modify the surface of nanomaterials using newly designed molecules by ligand exchange method, and finally test the cell viability of those new materials by incubating in the cell. For the stable dispersion of QDs, we synthesized a new type of zwitterionic polymer ligand to render QD surface adsorptive, thus developed a diagnostic agent which can retain their dimension stability from protein coagulation. The zwitterionic polymer is a random copolymer synthesized by the living radical polymerization with a narrow molecular weight distribution.