Protein nanoparticle probe-polyacrylamide copolymer hydrogel based diagnostic assay platform

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Protein nanoparticle probe(PNP)-polyacrylamide(PAA) copolymer hydrogel was synthesized through a simple one-step copolymerization and used as a diagnostic assay platform to break through traditional problems (i.e. low sensitivity and specificity, infeasibility of multiplex assay, random orientation of probes, probe instability, uncontrollable probe loading, etc.) of ELISA based assays. Here we show superior advantages of the diagnostic assays based on PNP-PAA copolymer hydrogel: probe immobilization without random orientation problem, controllable loading capacity of homogeneously oriented probes, protein-friendly environment, sufficient storage stability, much higher sensitivity than ELISA, and high specificity and reproducibility even in multiplex assays. PNP-PAA copolymer hydrogel was successfully applied to the sensitive and specific diagnostic assays of acquired immune deficiency syndrome (AIDS) and Sjögren's syndrome (SS).