PNA-mediated selective aggregation of reduced graphene oxides and application in detection of EGFR mutations

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We investigate selective aggregation of reduced graphene oxide (rGO) in aqueous solution using the peptide nucleic acid (PNA). It is well known that single-stranded DNA can easily adsorb onto the surface of GO by non-covalent π-π stacking interactions. Therefore, addition of PNA that is a DNA analogue with a neutral polyamide backbone into the rGO suspensions should result in adsorption of PNA on the surface of rGO. We used various microscopies and quasi-elastic light scattering to monitor the aggregation of GO. Furthermore, PNA-mediated selective aggregation of rGO was applied to detect mutations in DNA sequence. The PNA was designed to be complementary to the mutant type target DNA. If the mutant type target was present, double-stranded DNA was formed, preventing aggregation of rGO. Using this method, we could successfully detect mutations in DNA samples.

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