

Efficient Colorimetric pH sensor based on Responsive Polymer–Quantum Dot Integrated Graphene Oxide

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We report the development of versatile platform for a highly efficient and stable graphene oxide(GO)-based optical sensor that exhibits distinctive ratiometric color responses. Our sensing system is based on responsive polymer and quantum dot (QD) hybrids integrated on a single GO sheet (MQD-GO), with the GO providing high dispersion stability in water. The photoluminescence emissions of the blue and orange color-emitting QDs (BQDs and OQDs) in MQD-GO can be controlled independently by different pH-responsive linkers of PAA and P2VP that can tune the efficiencies of Forster resonance energy transfer from the BQDs to the GO and from the OQDs to the GO, respectively. As a result, the color of MQD-GO changes from orange to white to blue ratiometrically over a wide range of pH values. Furthermore, the MQD-GO sensor showed excellent reversibility and high dispersion stability in pure water, indicating that our system is an ideal platform for biological and environmental applications.