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Responsive Polymer Brushes on Graphene Oxide and Their Application as pH and Temperature Sensor K. PAEK, H. YANG, KAIST, J. BANG, Korea Univ., B.J. KIM, KAIST — Light emitting responsive polymer brushes were synthesized and grafted on grapheme oxide (GO), and their pH and thermal responses were quantitatively investigated by photoluminescence (PL) quenching efficiency from fluorophores in polymer brushes to GO. First, GO was functionalized with pH responsive poly(acrylic acid) (PAA)-pyrene coated CdSe/ZnS quantum dots (QDs) by pi stacking interaction between pyrene and GO. The FRET from QDs to GO was controlled through manipulation of the conformational features of the PAA chains that respond to pH changes in solution. The PL intensity of QDs was gradually increased in the decreasing of pH value. As another example, temperature responsive GO was synthesized with poly(coumarine)-b-poly(N-isopropylacrylamide)-b-poly(azidostyrene) (PCou-b-PNIPAM-b-PSN3) by covalent bonding between PSN3 and GO. The PL of poly(coumarine) was completely quenched at the temperatures above LCST of PNIPAM due to the collapse of the PNIPAM spacer. Therefore, their temperature response can be demonstrated and monitored by the PL quenching efficiency, exhibiting reversible, well-defined on-and-off switching behavior.

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