

## Apparent pH Sensitivity of Solution-Gated Graphene Transistors

이무형, 강문성<sup>1,†</sup>승실대학교; <sup>1</sup>승실대학교 화학공학과

Solution-gated graphene transistors were developed recently for use in pH sensor applications. The device operation is understood to rely on the capability of hydronium and hydroxide ions in solution to change the electrical properties of graphene. However, hydronium and hydroxide ions are accompanied by other ionic species in a typical acidic or basic solution and, therefore, the roles of these other ionic species must be also considered to fully understand the pH response of such devices. Using series of pH buffer solutions designed carefully, we verified that the magnitude and even the direction of pH-dependent Dirac voltage ( $V_{Dirac}$ ) shift (the typical pH sensing indicator) depend strongly on the concentration and composition of the buffers used. The results indicate that the interpretation of the apparent pH-dependent  $V_{Dirac}$  response of a solution-gated graphene transistor must include the contributions of the additional ions in the solution.